CITY GOVERNMENT

AND JOURNAL OF CITY AND VILLAGE AFFAIRS.

[Entered as Second Class Matter at the Troy, N. Y. Post Office.]

VOL. 8, NO. 6. JUNE, 1900. $3 A YEAR.

CITY GOVERNMENT,

Devoted to all Departments of City Work,

PUBLISHED MONTHLY BY

CITY GOVERNMENT PUBLISHING CO.

3 Western Union Bldg., . TROY, N. Y.,

Where all communications should be addressed.

WILLIAM S. CRANDALL, . . EDITOR

FRANK H. KNOX, TREASURER and PUBLISHER

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CONSULTING EDITORS:

ALEXANDER POTTER, Consulting Sanitary Engineer, New York City.

EMIL KUICHLING, C. E., . Consulting Engineer, 209 Clinton Ave. N., Rochester, N. Y.

WILLIAM R. HILL, Engineer Aqueduct Commission, New York City.

WILLIAM C. WOODWARD, M. D., Health Officer, Washington, D. C.

W. E. ROBERTS, Chief Engineer Fire Department, Denver, Col.

DAVID HUNTER, JR., . Supt. Public Lighting, Allegheny, Pa.

BENJAMIN MURPHY, Chief of Police, Jersey City, N. J.

CHARLES E. PHELPS, JR., Electrical Engineer, Baltimore, Md.

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United States and Canada, . $3.00 per year

Foreign Countries, . . . 4.00 "

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City officials and friends of City Government are cordially invited to make the offices of City Government their headquarters during their visit in either city. Desks, stenographers and stationery are placed at their disposal, and their mail may be addressed in our care.

CONTENTS.

Page.

EDITORIAL:

Index to Vol. VIII.—The End of Volume Eight—The Signs of the Times—"The Bogy of Home Rule"—Columbus Water Rates—False Pretences 139-140

Personals 141

PRESS COMMENTS:

A Scandalous Attempt at Intimidation—The City Record—Stop the Use of Preservatives—Vacation Schools and Play Grounds 141

Convention Dates 142

GENERAL:

Anti-Noise Crusade 141

The City Shares Corporation Profits.. 142

Official Blackmail 143

A Unique City Clerk 143

Municipal Governments for Philippines 143

Roosevelt and Coler on Reform 144

The Smoke Nuisance 144

Photographs for Cuban Teachers 144

What Engineers Think of "City Government" 144

Municipal Reform in the West—Clinton Rogers Woodruff 145

Philadelphia's Zoo 145

To Permit Side-Walk Riding 145

Dog Regulations 145

Revenue from Street Railway 145

Paragraph Items 142

THE PROS AND CONS OF PUBLIC OWNERSHIP.

Public Ownership Adopted 146

Ownership of Water System—A. S. Baldwin 146

Corporate Ownership—Grier Hersch.. 164

Municipal Gas Plants—Mayor Chase.. 165

STREET RAILWAYS:

Revenue from Street Railway 145

Richmond Traction Company 147

San Francisco's Fight for Low Fares. 147

One-Cent Fares at Troy, Ohio 150

Paris Underground Railway Employees—Edmond J. James 151

Automotor Street Railway Franchises 151

The Color Line in Street Cars 151

Street Railways in South Africa 157

PUBLIC SAFETY:

FIRE: Annual Reports 148

Examination of Probationers 148

Fire Alarm Damaged by Electrolysis. 148

Doorknockers on Engine Houses 148

Boston's Immunity from Heavy Fire Loss 149

Chief Hale's Plans 149

New Glasgow Fire Station 149

Fire Department Items 148-149

POLICE: National Convention of Police Chiefs 150

Toledo's New Jail 150

Police Items 150

HEALTH: Tuberculosis in Norway 150

Baltimore's Free Bath 150

PUBLIC WORKS:

WATER: Cincinnati's Filtration Plant 152

American Water Works Association.. 152

New York's Water Supply 152

Public Water Supplies from Driven Wells—E. Kuichling (Continued) ... 152

STREETS AND LIGHTING: Chicago's Rotten Pavements 156

Wood vs. Asphalt Paving 156

Testing Portland Cement at Berlin .. 156

Gas vs. Electricity for Lighting—J. R. Cullinane 156

SEWERS AND GARBAGE: Novel Garbage Complaint 157

Sewage Purification 157

City Sewage Farm 158

Collection of Garbage in Small Cities. 158

Purification of Sewage—Altoona, Pa.. 158

PARKS: The Parks of London 159

FINANCE: Financial Control Over Municipal Receipts and Expenditures—Albert F. Crosby 159

To Tax Automobiles 159

DEPARTMENT OF INQUIRY:

Discussing City Ownership 161

What Is the Cause of Bad Odor and Taste in Water 161

Cost of Electric Lights 161

Street Cleaning Statistics 161

Oil Used to Sprinkle Roads 161

MUNICIPAL ASSOCIATIONS:

Program of Municipal Electricians .. 162

Taxpayers' Union 162

An Invitation to Join 162

The Voters' League of Chicago—Edwin Burritt Smith 162

State League of Pennsylvania 163

A Town Transformed by Women 155

LEGAL:

End of the D'Esterre Case 147

Can Make Contractors Pay 159

Long Term Contract Permissable 166

PERIODICALS 161

TRADE NOTES 163

Indianapolis believes in the time-honored admonition, "If you don't see what you want, ask for it." She failed to observe any money in her treasury for paving around the Federal building and, therefore, asked for an appropriation from the General Government! Poor Indianapolis! Her modest request for $4,069 was rudely turned down and now she is disconsolate.

* * *

Some of the members of the Council of South Bend, Ind., have evidently been suffering from temporary aberration of the mind. It is the only charitable view to take of a recent action by the Council, granting a forty-year franchise to a local gas company without deriving a solitary benefit from the franchise. It was only on a vote of 6 to 4 that a motion to make the franchise for sixty years was lost. It is quite apparent that those members who voted "aye" on the passage of the ordinance considered the franchise of no value. In about five years they will, when it is too late, see their mistake and wonder why they could have been so blind to the general truth: Corporations never ask for valueless privileges!

* * *

A Cincinnati, O., contemporary says that, "Owing to inadequacy of funds the B. of P. S. has decided not to issue circulars to householders in reference to the separation of ashes and garbage, but has directed all the drivers in the Street Cleaning Department to personally notify all people on their several routes." The "Dusky" Queen City seems to revel in her unwashed and unclean condition, otherwise she would grant a much larger appropriation to the Street Cleaning Department. If she could only be clean and smokeless, like New York city, for ten days she would never again return to her old ways. Modern invention has placed such a condition within the realm of possibility. All that is required is the enforcement of a smoke ordinance.

Index to Vol. VIII.

The index to volume eight is mailed with this number. It will be noticed at a glance, that it is a real index, properly classified—not simply a table of contents. Everyone will appreciate the value of such an index, but not all will realize the amount of labor, thought and skill required in its compilation. As this is a departure from the former custom of "City Government" especial attention is called to the improvement.

This index will save the reader time and trouble. For instance, if he wishes to know what has been said about "street cleaning" in this volume, by turning to that topic he will find a page reference to every item. If the former practice had been continued, the reader would have had to go through the entire table of contents to find what he desired upon the subject, and even then he would be liable to miss much valuable information.

Mayor Hayes of Baltimore is strenuously advocating the installation of an ice plant at the city's expense. This would call for an expenditure of not far from $300,000. In view of the proposition for a municipal electric light plant, now under consideration by the Council, it would be wise to take heed to the Scotch proverb: "Make haste slowly." In the meantime it would do no harm to inquire into the reason for discontinuing the municipal ice plant of Boston.

* * *

In our May issue we published an article on "Mixing Concrete," by E. H. Allman, giving credit to "Clay Record" in which it had appeared as an original contribution. The Editor of "Municipal Engineering," of Indianapolis, Ind., informs us that it first appeared in the columns of that journal and should have been credited to it instead. The Editor of "City Government" is neither a clairvoyant nor a mind reader, and therefore could not avoid the error. It is now up to our contemporary, "Clay Record," to explain.

* * *

The editor of "City Government" thoroughly investigated the water situation at Springfield, O., more than a year ago, at which time he was interviewed by a reporter of "The Sun" of that city. Conditions as he found them and the remedy were frankly stated. At the time the apathy of the general public seemed so appalling as to discourage the hope of anything better, but subsequent events have shown that some seed took root. A recent interview of a prominent citizen in "The Sun" would indicate a change in public sentiment which is destined to bring about a reform in the management of the water department by the introduction of meters.

The End of Volume Eight.

In January, 1899, the controlling interest in "City Government" passed into new hands. The new management determined to establish it on a broader foundation, not all at once, but gradually as a wise business and editorial policy might dictate. The contrast afforded by a comparison of the December, 1898, number with the May, 1900, issue will be the best evidence that our effort has not been in vain.

The December issue contained, approximately, 35,610 words; the May, 62,107. In the December number there were 31 subjects treated, including the paragraph and dash items; in the May issue, 283.

That the quality of this largely increased amount of matter has also improved is attested daily, in the comments of our readers, and also by the good, healthy growth of our subscription list.

While the present management looks, with osme degree of satisfaction upon the achievements of the past sixteen months, it by no means intends to rest content. The plans already formulated for the general contents of volume nine involve larger expenditures of thought, time and money than in any preceding period. We purpose to maintain the record of improvement in the future that has marked the progress through the past year.

"Ich Dien," I serve, is the proud motto of a princely house, and we purpose making that our motto for the coming year. We will be most happy to conserve the interests of our readers and advertisers in every way possible.

The Signs of the Times.

Judging from the epidemic of municipal crime which is now sweeping over the country, including the larger and smaller cities, it would seem to be a time in which the pessimist would thrive and grow fat. It would seem, at the first glance, that optimism had not the ghost of a chance for consolation.

On the contrary, there never was a time when the optimist had better foundation for his hopes than at present. The attempt to blackmail the Hon. John Wannamaker of Philadelphia, of which an account is given elsewhere, the repeated exposures of bribery in Shamokin and Scranton, Pa., and other smaller cities throughout the country, are not an evidence of greater criminality among our public officials, but rather an indication of an aroused public conscience combating crime. History does not record a period when there was so great an interest in and as strenuous purpose and effort to secure good government as now. Public officials are multiplying who apprehend and believe that their strongest pull for continuance in office is not in the hands of the machine, but in the possession of the people, who will reward such public servants as continue to maintain the highest regard for common honesty, fidelity of purpose and efficient service. The Empire State affords two notable examples of this type—Governor Roosevelt and Controller Bird S. Coler of New York city.

The success with which these gentlemen have pursued the even tenor of the "strenuous life" and the practical unanimity of public sentiment in their favor, regardless of party lines, serves as a good omen and strengthens the belief of the optimist that public morals are improving.

"The Bogy of Home Rule."

Governor Roosevelt is deserting his first love, "home rule." It is true, we are after results, as he remarked to the writer not long ago, but we fail to see in home rule the bogy which so frightens the Governor. A year ago he fathered the state constabulary bill, which was defeated, and now he is reported as having suggested at a New York dinner the other evening, that it would be a wise provision to place the oversight of municipal accounts of Albany, Troy, Syracuse, Utica, Auburn, Rochester and Buffalo under the control of a state commission. The principle of each proposed measure is opposed to home rule which is the corner-stone of good city government.

This would mix the affairs of the city with those of the state. All effort should be to the contrary—the elimination of national and state politics from municipal affairs. To place a city, in whole or in part, in the hands of the state would make it necessary to carry the state election if objectionable measures were adopted. And this would make it possible for a city like New York to rule or ruin many of the smaller cities. The city should not be subject to the caprice of state legislators. Hardly a large city in the United States can be mentioned that has not suffered from state interference.

There is a state sovereignty and there is also a city sovereignty. There is only one contingency when the state should have the right to interfere with the city, viz., when it becomes unfit to perform the task assigned to it. In the point under consideration there is no such contingency.

Governor Roosevelt is wrong in his premises and, therefore, wrong in his conclusion. It has been found by experience and confirmed by reason that the management of the affairs of a city can be better carried on by entrusting it to the people of that city than to the state at large.

Columbus Water Rates.

Director of Public Works Kauffman of Columbus, O., is calling down upon his head the indignant but unmerited protests of water consumers in his city, solely and simply because he is attempting to place the water department upon a sound business basis. The opposition is founded on ignorance and prejudice.

No sane business man would think of continuing a business policy which placed the balance on the wrong side of the ledger year after year. And yet that is what Columbus citizens are doing. For years the metered water has been sold at the uniform rate of six cents per thousand gallons. No matter whether a consumer used one or fifty thousand gallons a year, he paid at the same rate. In consequence of this short-sighted policy there have been a number of bills for water service amounting to less than twenty-five cents a year and scores of others coming under the dollar mark. When it is remembered that a large per cent. of the total number of taps is metered, and also that the flat rate charged by the department is lower than the average price charged for similar services in seventy-five per cent. of the municipal plants throughout the country, it is easy to locate the cause of the Columbus water department being a constant drain on the Sinking Fund.

The howl raised about the establishment of a minimum meter rate is unreasonable in the extreme. There is a minimum charge made on the flat rate basis, which is considered equitable and just. Why, then, should it be less just to say that a consumer paying for water on the meter basis should be charged a minimum sum, no matter how much he may use? If the principle is applicable to the flat rate, it is none the less so to the meter.

There is no commodity delivered to consumers so capable of accurate measurement as water. And if there is ever an error it is invariably in favor of the consumer.

It is surprising what dense ignorance obtains among all classes of people about the use and value of water meters. The daily press in any city could render no better service to its constituency than to enlighten itself—if not already so enlightened—and then dispel some of the ignorance of the populace.

False Pretences.

Complaint reaches us about the non-delivery of a certain "Municipal Directory," and we take this opportunity of disclaiming any connection with such a book.

No one has ever had authority from us to solicit for such a book; no book of that nature is contemplated by us and our readers can be assured that in the publication of any book by us, public announcement of such fact will be made in these columns.

FRANK H. KNOX,
Publisher of "City Government."

Personals.

—Allan Benny is the new City Solicitor of Bayonne, N. J.

—Robert F. Gibson succeeds the late Mayor Giese of York, Pa.

—Isaac Marple is the new Chief of Police of Gloucester City, N. J.

—J. S. Pancake was elected Mayor of Romney, W. Va., at the May election.

—Mayor Edwin W. Fiske, Democrat, of Mount Vernon, N. Y., has been re-elected.

H. F. Miller has been appointed City Attorney of Fargo, N. D., by Mayor Johnson.

—Mayor C. J. Martin of San Jose, California, was re-elected by a large majority on May 21.

—W. R. Duly was elected Mayor of Little Rock by a recent special election. There was no opposition.

—Charles H. Harrison is the new superintendent of the Department of Highways and Sewers of Pittsburg, Pa.

—Mayor Matles of Nebraska City, Neb., has reappointed A. M. Munn City Engineer for another term of two years.

—Charles Maguire has been appointed Chairman of the Board of Public Works by Mayor Taggart, of Indianapolis, Ind.

—Robert R. Evans, City Engineer of Haverhill, Mass., has issued his annual report. It shows that the department has been kept extremely busy through the year.

—Superintendent Deuschle of the Columbus, O., Health Department, is thoroughly alert and up-to-date. He is now conducting a crusade against the use of poisonous preservatives used by milk dealers.

—M. A. Fanning, Secretary of the Cleveland Municipal Association, has started an eight-page weekly called "The Taxpayer." It will devote its space exclusively to the interests of the citizens of Cleveland.

—James B. Cahoon, formerly General Manager of the Elmira Electric Light, Gas, Water and Street Railway Company, has been made president of the National Electric Light Association. Mr. Cahoon is now located in Syracuse, N. Y., as consulting engineer.

—The Rev. Norman Fox is the newly elected Mayor of Morristown, N. J. In his inaugural address he advocated improvements to the streets and parks, and urged that partisan politics be eliminated from the municipal government in favor of business principles.

—Mayor Oille of Tonawanda, N. Y., believes the civil service law should be enforced to the letter. Because of his desire to enforce it in connection with the police department, he has had a clash at arms with the commissioners. At last accounts he had the best of the bargain.

—City Clerk Donovan, of Boston, has chosen for his messenger a 17-year-old girl, Miss Annie G. Riley, who is the first of her sex to hold such a position in Boston. The Civil Service Commissioners were unable to supply a girl in response to Mr. Donovan's request, and he therefore chose his own messenger.

—Mayor Burnside of Sioux Falls, S. D., has appointed the following members of his cabinet: City Auditor, E. G. Ledyard; City Attorney, Alfa F. Orr; Health Officer, Dr. A. H. Tuffts; City Assessor, H. M. Avery; City Engineer, S. B. Howe; Street Commissioner, T. W. Hardimon; Building Inspector, M. R. Lakey; Chief of Police, W. H. Martin.

—Mayor McGuire of Syracuse, N. Y., returned from a four weeks' trip abroad on May 26. He said he was impressed with the bigness of London and the loveliness of Paris.

—Emil Kuichling, C. E., who has been spending several months in New York city, has returned to his Rochester, N. Y., home and may be found at 209 North Clinton avenue.

—The city of Gilroy, Cal., elected the following officials on May 7: Mayor, H. R. Chesbro; City Clerk, C. N. Hoover; Treasurer, Henry Hecker; Marshal, James McElroy; Councilmen, A. Eustis, M. E. Ellis, L. J. Cleveland, George Skillicorn, J. W. Thayer and H. T. Mayock.

Press Comments on Municipal Affairs.

A Scandalous Attempt at Intimidation.

The Philadelphia "Record" in referring to the recent attempt to blackmail a prominent citizen of that city, by one of the chief officials of the city administration makes the following scathing editorial remark:

No man with an ounce of good blood in his veins can read Mr. Wanamaker's account of his interview with Mr. Abraham L. English, Director of Public Safety, without boiling with indignation. If Mr. Wanamaker had owned The North American newspaper, and had admitted his responsibility for its criticisms upon the public acts of Mayor Ashbridge, the bullying threats of Mr. English would have been none the less offensive. That insolent official, who undertook to muzzle the press by a threat of assault upon private character, is a despicable ruffian. He neither understands his duty as a public servant nor the enormity of his offense against public right. He ought to be instantly abated.—"The Record," Philadelphia.

The City Record.

The decision arrived at by the municipal authorities to cease the publication of the City Record is, in a number of ways, unfortunate. We dare say that the printing of this weekly publication may have been a slight cause of expense to the city treasury, for the number of outside subscribers cannot have been large, although we are inclined to believe that, as time passed, the circulation in this respect would have gradually increased. To those who have wished to keep informed concerning the proceedings of our municipal government, the City Record has furnished an admirable medium for intelligence. It gave in their entirety many reports which are ordinarily only summarized in the daily newspapers, and which, when printed as city documents, can often be obtained only after quite an interval of time, and then are not in compact form. Beside this, it informed the public of the meetings of boards having charge of various departments, and the matters that were up for discussion and action before these. Altogether, it was by far the best medium we have ever had in Boston of bringing those who have a serious interest in our civic affairs into touch with what was from day to day taking place in the City Hall. We believe that this is a class of inteligence to which the citizens of Boston are fairly entitled, and that the small saving that may be secured by the discontinuance of this publication will be far more than counterbalanced by the loss of a convenient opportunity of obtaining this public information. We imagine the controlling cause for putting an end to this publication was the wish to economize in expenditures, but it may also be pointed out that, if the wish on the part of those at the City Hall had been to conceal from the public as much civic intelligence as possible, this would have been one of the ways in which such a wish would have found expression.—"The Hearld," Boston.

Fifty Cents a Copy will be paid for a few copies of City Government, August and November, 1896.

Stop the Use of Preservatives.

Secretary Ogier of the State Board of Pharmacy has furnished the public some very interesting and valuable information regarding the effect of formaldehyde, used as a preservative by some dairyman, upon milk and cream. Mr. Ogier cites the experiments made by Dr. Frank Morrison, health officer of Indianapolis, which proved that the presence of very minute quantities of formaldehyde in milk retarded digestion and that any considerable quantity rendered the milk practically indigestible.

In the experiments made by Dr. Morrison a 40 per cent. solution of formaldehyde was used. This is about the average strength of the chemical prepared for preservative purposes. The coagulum formed by the digestive agent, rennin, in the presence of formaldehyde, was tough in proportion to the amount of the latter used. A single drop of the chemical in a gallon of milk retarded digestion and the retardation was increased by each additional drop of the preservative. The presence of more than three drops of formaldehyde in a gallon of milk rendered it practically indigestible.

In the light of these tests there can be no doubt that the use of formaldehyde as a preservative for milk is deleterious even in minute quantities, and its use should be prohibited. The city council should hasten to enact an ordinance that will abate the evil. An adequate penalty for the use of preservatives in milk should not only be provided, but authority should be given the health department to make such tests as will detect the presence of such preservatives. The people demand the fullest protection in a matter of such vital concern to their health.—"Ohio State Journal," Columbus.

Vacation Schools and Playgrounds.

The movement for vacation schools of instruction and recreation has been heartily indorsed by the board of directors of the Cleveland Chamber of Commerce, and it is not to be doubted will meet the approbation of the members and of citizens generally.

It is not proposed to make the attendance compulsory or to carry on the regular work of the school year. The object is to furnish occupation for children who would otherwise be on the streets and in mischief, and to make that occupation so attractive that the children will regard it as much in the light of recreation as of study.

In connection with this movement is the proposition to throw open the schoolyards as playgrounds for children. This will be another means of keeping them off the streets, and out of danger as well as out of mischief. In some parts of the city the schoolyards are the only available playgrounds for poor children, and whoever has seen the little ones compelled all summer to play in the streets outside of the closely locked gates of the convenient and tempting schoolyards, cannot but sympathize with the movement to open the gates and admit the children during the long vacation.

Vacation schools and opened schoolyards entail expense, and whatever the school authorities may be able to contribute towards the necessary cost will certainly fall short of the amount needed. The Chamber of Commerce may not contribute as a corporation for such a purpose, but the directors very strongly commend the movement to the financial sympathies of the members as individuals and to citizens generally. The response should be hearty and generous.—"The Plain Dealer," Cleveland.

Anti-Noise Crusade.

Chicago has an anti-noise ordinance and is conducting a lively crusade against certain ones. For several days the entire police force was engaged in taking an inventory of Chicago's stock of noises. It was found to be fine, large and complete, and was immediately labeled "the largest in the world."

The collection was properly classified as tolerable, intolerable and necessary noises. The intolerable noises are the only ones against which war is to be mericlessly waged. Chief Kipley of the police force has been placed in command of the combined forces for the suppression of the evil, and he promises to make the "Windy City" the quietest on earth in a short perod of time. Among the tabooed noises are the barking of dogs, the crying of cats, and the racket made by "owls" returning home after midnight.

Convention Dates.

Secretaries of Municipal Associations, Civil Engineers' Societies, Fire and Police Conventions, Electrical Associations, and of all other associations relating to any phase of municipal work will confer a favor on "City Government" by sending dates of annual and quarterly gatherings for record under this caption. The Editor would, also, be pleased to receive advance copies of all subjects discussed.

JUNE.

5-6.—Pennsylvania Four-County Firemen's Association, Stroudsburg.

5-6.—The American Park and Outdoor Art Association's annual convention, Chicago.

8.—Maryland State Firemen's Association, Baltimore.

12-13.—Western New York Volunteer Firemen's Association, Lockport.

12-14.—Minnesota State Firemen's Association, Winona.

12-14.—North Dakota Firemen's Association, Larimore.

13-15.—Maryland State Firemen's Association, Baltimore.

19-20.—Jefferson County (N. Y.) Volunteer Firemen's Association, Clayton.

19-20.—Hudson Valley Volunteer Firemen's Association, Peekskill, N. Y.

21-22.—Rhode Island State Firemen's League, Bristol, R. I.

JULY.

2-7.—American Society of Civil Engineers, Institution of Civil Engineers, Great George street, London, England.

3-4.—Oneida County Association of Active and Exempt Volunteer Firemen, Boonville, N. Y.

10-13.—North Carolina State Firemen's Association, Wilmington, N. C.

18-19.—Tri-County Volunteer Firemen's Association of Western New York, Waterloo.

24-26.—Nebraska State Firemen's Association, York, Neb.

AUGUST.

1-2.—Maine State Firemen's Association, Gardiner.

16.—The general meeting of the American Institute of Electrical Engineers, to be held in Philadelphia on May 16, will adjourn to meet in Paris in joint session with the British Institution of Electrical Engineers.

21-24.—New York State Firemen's Association, Syracuse, N. Y.

28.—American Society for Municipal Improvement, Milwaukee, Wis.

SEPTEMBER.

12-13.—New Jersey State Firemen's Association, Atlantic City, N. J.

22-26.—National Prison Association, Cleveland, O.

25-27.—International Association of Municipal Electricians, Pittsburg, Pa.

26-28.—Virginia State Firemen's Association, Richmond.

OCTOBER.

1-5.—American Public Health Association, Indianapolis, Ind.

2-5.—Pennsylvania Firemen's Association, New Castle.

9-12.—International Association of Fire Engineer's, Charleston, S. C.

DECEMBER.

12-15.—League of American Municipalities, Charleston, S. C.

The City Shares Corporation Profits.

The Council of Salt Lake City recently passed resolutions providing for the city's having a share of gross earnings of all franchises granted. They follow:

"Resolved, That in granting any franchise of any nature for any purpose wh tever, the City Council of Salt Lake shall demand adequate compensation in a continuous income from the gross earnings of any corporation or of private parties asking for a franchise. And be it further

"Resolved, That no franchise be hereafter granted by the city which does not reserve to the municipality the right to become repossessed of such franchise upon the payment to the owners thereof a fair and equitable sum for investment and interest on the actual expenditures involved."

General Items.

Cleveland, O., proposes to put a big tax on circusses and other amusements. A new ordinance fixes a tax on circuses of $250 a day. This is the same as in the old license. Theaters are taxed $75 a year, $25 more than in the old license.

* * *

Aurora, Ill., Common Council has passed a curfew ordinance. Also an ordinance prohibiting the firing of giant firecrackers within the city limits. If the latter is rigidly enforced on the ever glorious Fourth there is likely to be less damage to life and limb.

* * *

The mechanical filter companies which are fighting for recognition in connection with the establishment of a filtration plant in Pittsburg, Pa., have gained a point by securing the passage of a resolution through Councils which will open the bidding to all systems of filtration.

* * *

An effort is being made in Pittsburg, Pa., to secure a new charter. It is proposed to invest the Mayor with the power of appointing the department heads. And it is claimed that a good business man at the head of the city's affairs should receive a salary of $10,000 a year.

* * *

At a recent election in Annapolis, Md., the novelty of women voting was witnessed. The question to be decided by the registered voters and taxpayers of the city was whether or not the city would bond itself for $121,000 to provide for street and other improvements. All taxpayers, women included, were permitted to vote on the question. The bond issue was authorized by a vote of 560 to 119. Fourteen women availed themselves of their privilege of exercising the right of franchise.

* * *

Over 5,000 Berlin street car men recently struck for higher wages. They had been getting between $23 and $33 a month. This was not enough, they said, for a married man to live on. The cost of living is high, partly because of restrictions on the importation of cheap American food products. It is not surprising that the employees found their low wages inadequate and tried to have them increased. They appear to have succeeded in this to some extent through the mediation of the authorities.

* * *

George H. Stone of Thomasville, Ga., has begun a peculiar suit against the Southern Bell Telephone Co. in the United States Court at Savannah. He seeks to recover $26,900 damages from the company because of the destruction by fire of his home in Thomasville. When Mr. Stone discovered at 2 o'clock in the morning that his house was on fire he attempted to notify the fire department, but was unable to get a response to his frantic rings from the central office of the telephone company. It is alleged by Mr. Stone that he was a subscriber of the telephone company, as was also the Thomasville fire department. He also maintains that it was the business of the company to furnish all its subscribers communication with each other at all hours of the day and night.

The deadly grade crossing is receiving earnest attention in Syracuse, N. Y., Indianapolis, Ind., Reading, Pa., Allegheny, Pa., and Cleveland, O.

* * *

Bridgeport, Ct., after a long and earnest effort to have its sewer work performed by day labor instead of contract, has finally lost the fight. Council has voted to continue the contract system.

* * *

The city of Toledo, O., has won in its long contested gas case against the Kerlin Brothers, who sought to purchase its gas plant for less than its real value. The sale of the plant has been indefinitely postponed.

* * *

Kansas City, Mo., has a new kind of a municipal organization. It is known as "The Alley Purifiers of Block 128." The citizens of this block have banded themselves together to keep the alley abutting on their lots clean and in a sanitary condition.

* * *

Glasgow, Scotland, has erected a municipal day nursery of 160 rooms, at a cost of $85,000, for the accommodation of motherless families or for small children whose mothers go out to daily labor and must leave their dependent offspring at home. It is not an orphanage, not a charity at all in the strict sense of the word, since the working people who avail themselves of its privileges pay a small sum for what they receive.

* * *

Councilman J. L. Riley of Cleveland, O., has introduced an ordinance to govern and regulate the speed of automobiles. It provides that this class of vehicle shall be equipped with two lamps, one on either side, and that they shall also be provided with a bell or gong, which shall be sounded at a distance of not less than 100 feet upon the approach to any street or crossing. The ordinance also provides that automobiles shall not be run at a speed faster than twelve miles an hour.

* * *

According to a recently published report of the third annual convention of the Association of Cleansing Superintendents of Great Britain, mechanical power is being successfully substituted for horse power in the cleansing departments of several British cities. Not only does the small town of Chiswick report a money saving thereby in dust collection of over 50 per cent. in two years, but the city engineer of Liverpool announces a 50 per cent. saving from an eight months' trial of a steam motor for dust collection, and Glasgow has embarked upon an experimental use of an electric dust van.

* * *

The last Ohio state Legislature passed a law in reference to the practice of the occult professions. It provides that whoever shall represent himself to be an astrologer, a fortune teller, a clairvoyant or palmist, shall be guilty of a misdemeanor, and on conviction shall, for each and every offense, be fined not more than $100 and not less than $25, or imprisonment in the jail for a period not longer than three months nor shorter than thirty days, or shall, within the discretion of the Court, be both fined and imprisoned. Chief of Police McDowell of Youngstown, O., proposes to enforce the law to the letter. The palmist, clairvoyant and fortune-teller will have to quietly fold their tents and steal away to other pastures green and prospects fair.

Official Blackmail.

Chapter I.

"The North American," a paper of Philadelphia published by Thomas H. Wanamaker, son of "Honest John," had the audacity to criticise some of the official acts of Mayor Ashbridge and his cabinet.

Chapter II.

His honor (?) and "Co." did not relish the publication of facts. They preferred fiction. The Mayor's man Friday, Director of Public Safety (?) English, accompanied by Friday, Jr., George Perrie, Commissioner of City Property, called upon the Hon. John Wanawaker at his business office. Mr. English acted as spokesman and asked if Mr. Wanamaker would have the kindness to discontinue the publication of the facts in the "North American" about the administration? "It hurts our feelings," he said, "and may damage our reputations (?)."

Mr. Wanamaker said that the paper did not belong to him and that he had no wish to interfere in his son's affairs.

Whereupon, Mr. English raised his finger and shaking it at Mr. Wanamaker said, "Well, sir, I insist that you shall stop these attacks of the "North American" on the administration. If you do not, you will have no one to blame for the consequences but yourself."

Mr. Wanamaker replied:

"I request you to leave my office at once."

Exit, English and Perrie.

Chapter III.

The daily press of the city of the next morning contained a signed statement of Mr. Wanamaker, giving a detailed and verbatim account of his interview with the Mayor's faithful Fridays.

Chapter IV.

Great public furor and demonstration of indignation throughout the city over the bold attempt at blackmail by the officials of the city administration.

The Board of Managers of the Municipal League immediately adopted resolutions requesting Mayor Ashbridge to summarily dismiss his Director from office, provided he disavowed all connection with the transaction himself. Failing in this, the Mayor, himself, was invited to resign.

Chapter V.

The greatest mass meeting ever held in the Quaker City convened in the Academy of Music on the evening of May 25 to protest against the scandalous attempt to blackmail a private citizen. Hundreds of people were unable to gain admittance. The meeting adopted a set of resolutions, calling upon the Mayor and the Director to vacate their positions if they could not clearly establish their innocence of the charge of threatening Mr. Wanamaker.

A committee of twenty citizens were selected to present the resolutions to the Mayor.

Chapter VI.

A petition containing the signatures of over 50,000 citizens was presented by the Committee of Twenty to the Mayor, together with the resolutions adopted by the mass meeting.

Chapter VII.

? ? ?

The city of Hamilton, O., by ordinance, decrees that all cement walks hereafter laid shall be darkened with lamp-black so as to leave the surface black and not a glaring white, which is so ruinous to the eyesight.

A Unique City Clerk.

BENJAMIN TAPPAN AUGUST.

The City Clerk of Richmond, Va., Benjamin Tappan August, has such a unique record that "City Government" cannot refrain from introducing him to its readers.

Mr. August has been a member of the Council for thirty years, fifteen of which he has served as City Clerk. Previous to his election as City Clerk he performed the duties of Sergeant-at-Arms and Committee Clerk to the Council. The most remarkable part of his career is that during his entire official life he has never been absent from a meeting of the body, has never had a vacation and during that long period of uninterrupted service has never had but one opponent, and that when there was a change in the political complexion of the Council. But even then he was elected by an overwhelming majority. His election takes place again next month, and up to date he has no opponent.

If there is any other city official in the country with a longer record "City Government" would be glad to hear of him and introduce him to its readers.

Municipal Governments for Philippines.

The first step toward the civic redemption of the Philippines has been taken. Last January a Board, composed of several American army officers and several prominent Filipinos, with his Honor, Don Cayetano Arellano, Chief Justice of the Philippines, as president, was appointed to submit a form of municipal government for such of the municipalities of the islands as are prepared to adopt representative control over their own civil affairs, and which may have become applicable to others as soon as they demonstrate a fitness for self-administration. Gen. Otis considered the report made by this board to be satisfactory, and in general orders No. 40, under date of March 29, he made it a law.

The details of the regulations as expressed in No. 40 are conceded to be excellent; they are a compilation of the best of two or three codes of municipal law, wisely made applicable to local conditions. Under it the people are granted more latitude and freedom than they have ever before enjoyed. In Chapter 1 of the enactment it is stated that the former town boundaries shall be maintained; that duly incorporated towns may sue and be sued (Manila is exempt from this provision); that municipal officers are elected for a term of two years, and that the towns of the islands shall be divided into four classes, those of 25,000, 18,000, 10,000 and more than 2,000 inhabitants.

In Chapter 2 the matter of suffrage is determined as follows:

1. Those who, prior to the 13th of August, 1898, held the office of municipal captain, gobernadorillo, lieutenant or cabeza de Barangay.

2. Those who annually pay 30 pesos ($15 in gold) or more of the established taxes.

3. Those who speak, read and write English or Spanish.

The tax clause shuts out many of the poorer classes and the language restriction prevents from voting hundreds of thousands of natives who only talk dialects. Both clauses are considered fair and just, and it is estimated that their enforcement will accord the suffrage to about 10 per cent. of any given community. The fact that each elector must take oath of allegiance to the United States is stated in this chapter. Chapter two further gives the details and laws regulating the electing of officers and declares that elections shall take place in December and elected officers shall enter upon their duties the following January.

Chapter three is devoted to a description of the qualifications and duties of the municipal council, of which there shall be elected eighteen for towns of the first class, fourteen for those of the second, ten for those of the third and eight for those of the fourth class. The duties of these councils embrace the administration of police, health, plantations, irrigation, live stock, licenses, public works, schools, roads and other municipal affairs.

Concerning taxation, chapter five contains the statement that: "Taxation shall be uniform and just. Persons deeming themselves injured by any tax levy may protest to the council, who shall consider and determine such protests. Should the protest be disregarded the protestant may appeal to the Provincial Governor."

Chapter six defines the duties and powers of the Provincial Governor in relation to the towns. Great power is vested in this official, who is given general supervision and control of the municipal affairs of the towns and cities in his district. Until the appointment of Provincial Governors, their duties shall be performed by the commanding officers of each military district. It is not yet made clear who will fill these positions of Civil Governors. The present military authority will wait for the new civil commission to act in this respect, and the impression prevails that American civilians will eventually be appointed to these important posts.

This whole matter of municipal governments is tentative and its success is problematical. In view of the signal failure of nearly every civil government established in the past, proven by the known treason of many alcaldes and the mass of evidence daily accumulating against those still remaining in office, it is most doubtful if this broader scheme of government could successfully be applied to-day. Whether we shall be able to successfully apply it next December is a question open to unlimited discussion.

Roosevelt and Coler on Reform.

At a recent dinner given in honor of William F. King, president of the Merchants' Association of New York city, at the Waldorf-Astoria, there were some good things said about the general problem of municipal affairs. Governor Roosevelt spoke to the toast, "Municipal Finance." He said in part:

"Waste is the largest single element in municipal finance. It persists largely because taxpayers cannot properly analyze public outlays. It could be greatly lessened by a system of public accounts and reports which would separate the wasteful from the useful outlays and subject them frequently and in a concise form to the scrutiny of taxpayers.

"Good legislation does not secure good government, which can come only through a good administration; but wise laws will enable the citizens of each municipality to get good government if they choose. Albany, Troy, Syracuse, Utica, Auburn, Rochester and Buffalo might well have a uniform plan of administration, identical departments with identical duties and a uniform system of accounting. In monthly reports made to and published by a state of municipal accounts, every class of outlay in all of those cities might be published in parallel columns, both by totals and reduced to ratios, for comparison. It would be difficult and dangerous for officials to waste money under such scrutiny.

"The proper remedy is the application to the public business of the methods which have been found essential and effective in the management of private business affairs."

Upon the subject of "Necessity of Publicity in Governmental Affairs," Controller Bird S. Coler, of New York city, said in part:

"To-day the crying need of every great American municipality is the application of honest and practical methods to the conduct of the business of the people. We want less theoretical reform and more good deeds; fewer laws and more law-abiding public servants. We want aroused public opinion that will not tolerate dishonesty or incompetence in public office.

"There can be no real and permanent reform of city government until we create a public opinion sufficilently intelligent to understand and compel new methods. The city of New York and every city in the state, is to-day suffering loss and enduring petty corruption because we have no uniform and correct system of bookkeeping for our municipalities.

"I believe in the power of government to regulate whatever it creates and the taxpayers as well as investors have a right to know the business methods of corporations operating public utilities or holding franchises for the use of the property of the people. Under the system of management and bookkeeping that prevails with most corporations in this city, the municipality is powerless to enforce its rights. The city is supposed to collect a percentage of the receipts of a number of corporations that hold franchises for the use of the streets or other public property. The city may be, probably is, cheated every day. The companies can keep one set of books for our examination and another set for their directors and the city is compelled to accept whatever mite of earnings they see fit to give us.

"We may examine the books of these companies, but unless we can enforce some fair and uniform system of bookkeeping we must trust to the honesty of the corporations to show us the right set of books. Strict honesty is not always the policy of corporations, therefore it is safe to assume that the city is loser by present methods.

"There is but one way to bring about a permanent change of the present unbusinesslike conditions, and that is to arouse the people to an intelligent understanding of their rights and duties, and two powerful forces are now working to that end. One is the awakened sentiment against unrestrained and corrupt combinations of capital, that are indifferent to the rights of the public, and the other is the honest and intelligent work for better government done by representative citizens united in organizations like the Merchants' Association."

President King made some very pertinent remarks upon "Organization and Its Benefits." Among other things he said:

"The present condition of our city affairs is due entirely to the indifference of our citizens and taxpayers. My experience with this association during the past three years has shown me that many of our citizens fear to antagonize a certain element. This is especially true of real estate owners and others who are dependent to a large extent on certain public departments.

"I am firmly of the belief that with proper organization of capable, honest men, who are fearless and independent, with no personal axes to grind, asking no favors and granting none, seeking no public office, with proper financial support with such an office staff as any railroad or corporation would employ to carry out the detail work, New York could within a few years be relieved of this great octopus and its city government be put on a sound commercial basis.

"It cannot be done through spasmodic reforms, investigating committees or sensational journalism."

The Smoke Nuisance.

The city of Syracuse, N. Y., is conducting a lively crusade against the smoke nuisance.

* * *

Building Inspector Bedell of Indianapolis, says "The News," commenced enforcing the smoke ordinance on June 1.

* * *

The city of Denver, Colo., although meeting with great obstacles in enforcing its smoke ordinance keeps up a stubborn fight.

* * *

Smoke Inspector Schubert of Chicago continues to wage war on the negligent manufacturers. He has recently entered suit against several violators of the smoke ordinance and secured six convictions with fines ranging from $15 to $50.

* * *

Washington, D. C., has a regulation for the suppression of smoke within its limits which has had to fight for an existence. Thanks to the vigorous and uncompromising policy of Health Officer Woodward, whose duty it is to enforce the anti-smoke ordinance, the struggle has een pushed to a finish, and the constitutionalty of the law, as applicable to Washington, has been declared by the Court of Appeals. The National Capital may now be kept free from smut and smoke.

Photographs for Cuban Teachers.

A committee of the Twentieth Century Club of Boston has been appointed to aid in offering courtesies to the many hundreds of Cuban teachers who are to spend two months in our country and who will carry back to every town in Cuba impressions of the character and civilization of the American people. On these impressions largely depends the future attitude of the Cuban people to our nation. It is desirable that they should carry back with them, not only memories of days crowded with new experiences, but also some visible mementos of their journeys which will bear witness to their pupils and neighbors of the great country that is lending them a helping hand.

To this end the committee requests the public to send for it to classify and distribute, mounted photographs or other illustrations of salient features of our life that are little known in Cuba. The photographs should be instructive rather than merely artistic or decorative. Churches, schools, factories, libraries, shops, machinery and homes are all good subjects.

Each picture should be mounted on cardboard and should be plainly labelled on the back.

Packages will be received until August at the Club rooms, 2 Ashburton Place, Boston, Mass. All packages should be labelled "Cuban Teachers," and should be addressed to the Secretary of the Twentieth Century Club.

What Engineers Think About "City Government."

Edward R. Cary, City Engineer of Troy, N. Y., member of the Faculty of Rensselaer Polytechnic Institute:

"I find that "City Government" is a valuable addition to my monthly reading, covering the field of municipal work very fully and explicitly."

F. V. E. Bardol, Chief Engineer of the Department of Public Works, Buffalo, N. Y.:

"I know of no journal which covers the entire field in such a complete and thorough manner, and sincerely believe it should be read by all interested in municipal affairs."

Emil Kuichling, Consulting Engineer, recently Chief Engineer of the Rochester, N. Y., water works:

"I find "City Government" exceedingly useful, as it supplements the technical engineering articles of other publications with valuable collateral information relating to municipal service which is indispensable to active city engineers and water works superintendents."

L. F. Chapin, Consulting Engineer, Canton, O.:

"I take pleasure in making the statement that in my opinion no City Engineer can afford to do without "City Government." Its news from month to month in the way of papers on city matters is invaluable to city officials, and every city government should see that a copy is placed in the hands of its clerk and engineer."

E. A. Fisher, City Engineer, Rochester, N. Y.:

"I have been a subscriber to your valuable journal since it was first issued, and I believe it has been of very great value to City Engineers in showing what is being done in the various cities in the matter of municipal work. I think the paper is especially valuable the present year, and that the additions to your editorial staff will make it increasingly valuable."

Municipal Reform in the West.

By Clinton Rogers Woodruff, Philadelphia.

Until within a compartively few years not much was heard concerning municipal reform in the West, for the very simple reason that the cities were so occupied with territorial expansion and efforts to surpass nearby rivals in extravagant figures as to resources of various kinds, that they had little time for much else. Consequently political affairs in the cities fell into the hands of the spoilsmen. The situation is somewhat changed now, and we find the municipalities beyond the Mississippi devoting quite as much attention to reform as their eastern sisters; in some places more, for whatever they undertake they carry forward with great energy. The rise of populism added to the general discontent of this section; for while most Populists believed in a change of conditions in the cities, not all municipal reformers were by any means Populists.

One feature of municipal reform in the west is especially worthy of mention. The commercial and mercantile bodies are taking active part in its advancement. In Minneapolis both the Commercial Club and the Board of Trade (as also the corresponding bodies in St. Paul) have manifested the deepest interest in the work of improving the local government and have co-operated with every movement looking toward a realization of higher municipal ideals. In San Francisco one of the most energetic bodies of workers in the cause is the Merchants' Association. Indeed, in nearly every western city the business organizations are at all times in readiness to co-operate with public-spirited citizens to advance good government, and already a number have become affiliated members of the National Municipal League.

Iowa is dotted over with good government clubs and leagues of various types. The most recently effected organization in the state is the league of Iowa municipalities, being a federation of Iowa cities and towns formed for their improvement and control by mutual conference and interchange of ideas among the various city officials; and to secure such legislation as is necessary or desirable for the benefit of the same. In Missouri we find civic federations in St. Louis and Kansas City. In North and South Dakota practically nothing has been done save a few ministerial efforts in the direction of law and order work. The same is true of Nebraska outside of Omaha. In that city a municipal league and a good citizenship educational league took up the work; but the league's work was considerably handicapped by the A. P. A. movement. The towns and cities of Kansas have displayed a fitful interest in municipal reform. In some the enforcement of the prohibition laws has monopolized attention. The Christian Citizenship League of Wichita a short time since defeated the "whiskey" candidates. It closed thirty saloons and forty-seven places of ill-repute and wielded the balance of power. The Topeka Municipal League maintained its existence and not much more; although it made strenuous efforts to create interest.

A citizens' committee of one hundred in Bozeman, Montana, elected a few years ago a mayor, city attorney, police magistrate, and three out of four aldermen. Economical administration was introduced, to the manifest advantage of the community. In Helena several movements for reform organization have been started, and its law and order league has had a useful career. In Colorado reform activity is mainly confined to Denver, Colorado Springs and Pueblo, although there is an occasional effort made in some of the other towns, like Aspen and Leadville. Salt Lake City, Utah, has a Good Citizens' League that aims to induce the moral and worthy men of all creeds, classes, and parties to take an active interest in public affairs. A Citizens' League was formed in Phoenix, Arizona, to guard the money paid by taxpayers and to ferret out public evils and prosecute those responsible for them. The first municipal election under the new charter of San Francisco took place on Tuesday, November 7, 1899. At this municipal election a complete set of municipal officials, as prescribed by the charter, were elected.—"Public Opinion," New York.

Philadelphia's Zoo.

The twenty-eighth annual report of the Zoological Society of Philadelphia, just issued, shows a markedly prosperous year compared with the one immediately preceding. Admissions were 202,514, being nearly 50,000 more than the year before, and to be classified as follows: Paid admissions, 169,985; members, 2,159; loan holders, 13,559; free admissions, 3,605; members of the Grand Army of the Republic, 5,364; coupon and excursion tickets (the former numbering 400), 7,842. The largest attendance in any month was in September, reaching 42,276; and the largest on any day was on Wednesday, September 6th, numbering 5,320. The daily average throughout the year was 555. The receipts for the year from admission fees were $7,212.09 in excess of those taken in the year previous, the total amount being $27,882.16. The entire income as stated by the treasurer, Henry T. Coates, was $48,-979.77. The Board of Directors placed the sum of $5,120.40 to the credit of profit and loss, after the expenses, exclusive of permanent improvements, had been paid. There are at present 1,134 living specimens in the collection at the Garden, divided as follows: 386 mammals; 506 birds; 224 reptiles, and 18 batrachians—of these 17 were born members of the diversified family, the remainder being presented or purchased. The accessions were 910.

To Permit Sidewalk Riding.

An ordinance has been introduced in the Indianapolis City Council, in favor of bicycle riders, which is backed by the bicycle dealers of the city. It permits riding on the sidewalks where streets are not permanently improved, under the following conditions: The rider must not exceed a speed of five miles an hour; he must dismount before attempting to pass a pedestrian; he must carry a good alarm bell, and failure to ring it on approaching a pedestrian is a violation of the ordinance; at night he must carry a light that can easily be seen for a distance of 200 feet; the penalty for violation is a fine of not less than $10 nor more than $25, to which may be added imprisonment for not more than thirty days.

Bicycle dealers say they have received many complaints from men whose work takes them to factories in the outskirts, where the streets are not improved. They are not permitted to ride on the sidewalks, and therefore bicycles are useless. The dealers say ordinances similar to this of Mr. Negley are in force in Portland, Ore., and other Western cities, and are regarded successful. The ordinance was referred to the committee on public safety and comfort.

Dog Regulations.

Mayor Carnahan of Rochester, N. Y., has ordered that during the months of June, July, August and September, in the year 1900, the owners of all dogs are forbidden to allow such dogs to run at large in any public street or place within the city of Rochester, unless such dogs shall be securely muzzled, or led by a line or chain, so as to effectually prevent them from biting any person or animal. Any person violating this order will be punishable, pursuant to the terms of such ordinance, by a fine of not less than two dollars or more than one hundred dollars, and in default of the payment of such fine, by imprisonment in the Monroe county penitentiary for a term not exceeding one hundred days.

* * *

The City Council of Jacksonville, Fla., has enacted, that every person owning, possessing, keeeping or harboring any dog within the limits of the city of Jacksonville shall, from and after the first day of June, 1900, and annually thereafter of each year, or at such other time or times as he may come into possession of any unlicensed dog, pay to the City Treasurer of said city a license fee of 50 cents for each dog so owned, possessed, kept or harbored by him, and shall cause such dog to be registered in the office of the City Recorder in a book kept for that purpose, and shall also, at the time of such registry, obtain from the City Recorder the metal tag described in section 2 of said ordinance.

* * *

Alderman Thomas of Columbus, O., has introduced an ordinance in Council, requiring that all dogs shall be muzzled during the months of June, July, August and September. Also, that a poundmaster be appointed to serve during the above named months, whose duty it will be to impound all unmuzzled or stray dogs. No dogs shall be released from the pound except on the payment of a fee of 50 cents. Furthermore all dogs not claimed and released within 48 hours after being impounded shall be disposed of as the director of public safety shall provide, or if the animal is worthy and valuable, the same shall be sold by public outcry to the highest bidder at the hour of noon next succeeding the said 48 hours.

Revenue from Street Railway.

There are few cities that receive larger revenues and better service from street railways than Cincinnati. The service rendered by the street railway company of that city compares favorably with the best in America. Its employees are courteous and accommodating, while the many cars in use make the transit about the city as rapid as is consistent with the use of surface cars only.

The revenues derived from the company by the city are as follows:

Car license for 1899, at $4 per lineal foot for cars in service, $24,869.60.

Five per cent. on gross earnings for

Quarter ending March 31, 1899..$30,429.39
Quarter ending June 30, 1899.. 38,140.77
Quarter ending Sept. 30, 1899.. 39,050.91
Quarter ending Dec. 31, 1899.. 36,662.48
Total $144,283.55

State excise tax of one-half of one per cent. on gross earnings, $14,428.35.

Eighth street viaduct rental, $1,000.

Eden Park right of way, $234.

Vehicle licenses, $185.

County taxes for 1899, $48,268.94.

Total amount paid during 1899, $232,-269.44.

The Pros and Cons of Public Ownership.
Discussion Solicited.

Public Ownership Adopted.

The city of Frankfort, Ind., according to one of our exchanges, completed the installation of a municipal electric lighting plant on June 1.

* * *

It is currently reported that the municipal ownership of electric and water plants has been voted on favorably by the people of Thorntown, Ind., the vote being an unusually large one. For a year or more the town authorities have endeavored to secure light and water service, but threats of injunction, if it was undertaken, have hindered them. The vote at the election showed the sentiment to be largely in favor of the undertaking.

* * *

The city of St. Joseph, Mo., gained municipal ownership of its street lighting plant four years ago, says an exchange, and comparison of the results in this period with those of the preceding four years shows a saving of $28,914.60, or an average of more than $7,000 a year. The average cost per lamp during the first four years was $81.95, and during the last four years $61.73, an annual saving of $20.22 per lamp.

* * *

The annual report of the electric light and power plant of Portland, Ind., gives conclusive evidence as to the question of municipal ownership proving profitable and to the best interest of the city. The Portland plant was purchased on May 1, 1895, for $17,140, and improvements have since been made which ran the total cost to $20,344. The total receipts since the plant was bought amount to $18,878, not including the saving to the city in the cost of street lights. The cost of operation during the period has been $24,698. Before the city bought the plant it was paying $85 a year for each street light. Taking this saving from the receipts leaves a profit of 15,697. The plant is in good condition, giving both the city and citizens good service.

* * *

The chief engineer in charge of the city gas works of Blackpool, England, according to "The Surveyor," had a profitable year in 1899. He reported a gross profit of over £20,000. After allowance for depreciation, sinking fund and other charges, there is a sum of £12,000 available for the relief of the rates. By way of illustration of the progress of the undertaking, he mentioned that in 1895 the profits amounted to only £5,620. A year ago the total output of gas was 384,500,000 cubic feet, which in the year just ended was exceeded by 40,000,000 cubic feet. In the current year, it is feared, it will be necessary either to raise the price of gas or to increase the rates. Not less than 45,000 tons of coal will be needed, and the cost will be 6s. a ton more than the old prices.

The city of Watertown, S. D., proposes to have a fine electric fountain placed in the court house square. One of its prominent citizens recently visited Le Seur, where such a fountain had been installed and he was so pleased with the effect that he proposed one for his own city. The waterworks company and the electric light company have offered to furnish the lights and water if the county commissioners will put in the fountain, and strong pressure is being brought to bear upon them to secure this decision.

Ownership of Water System.

By A. S. Baldwin.

I am somewhat inclined to the belief that there is a disposition on the part of the community to censure the city officials for proceeding hastily, as they think, in the acquisition of public utilities. This is hardly fair to them. The press (in part, at least) has strongly advocated the purchase by the city of the water works, gas works, electric light plant and other utilities. The charter declares it "to be the purpose and intention of the people of the city and county that its public utilities shall be gradually acquired and ultimately owned by the city and county;" also, that they (the supervisors), within one year after the charter goes into effect, and every two years thereafter, must procure, through the city engineer, plans and estimates of the actual cost of the original construction and completion by the city and county of water works, gas works, etc. Also, that after such plans and estimates shall have been procured and filed the supervisors shall, at as early a date as they deem for the best interests of the city and county, enter into negotiations for the acquisition of each or any of said public utilities as they may regard as "most important" to the city and submit them to the electors at a special election. And further, that before doing this, "the supervisors must solicit and consider offers for the sale to the city and county of existing utilities in order that the electors shall have the benefit of acquiring the same at the lowest possible cost thereof."

The charter was adopted by the people and ratified by the legislature. It becomes, therefore, incumbent upon the officials elected under it to carry out its provisions, and we have no right to blame supervisors for requiring the city engineer to prepare plans and estimates of water works, etc., even if it does cost $100,000 to do it. If we get weary of it we can amend the charter. That is the remedy, and the only one. For the present we must deal with the law as it is: and as the supervisors have, in accordance with the charter, declared the most important public utility which the city should acquire is the water works, the question for the people to determine is, whether they want to buy out the Spring Valley Company or acquire any other water supply.

The supervisors have requested, by resolution, the Spring Valley Water Works to place a figure on all of its property, and to name a price at which it will sell the same to the city. The same resolution also recites that "any overvaluation of its property will compel the people of San Francisco to look elsewhere for their water supply," etc. The figure unofficially mentioned as being satisfactory to the city is $15,000,000, and I suppose if the company declines to accept this sum the "people of San Francisco will look elsewhere." As I am not a stockholder in the Spring Valley Company, I hope that if the city concludes to go into the water business it will succeed in buying this system for $15,000,000; but as there is at present no tendency on the part of stockholders and bondholders of the company to part with their securities at 50 per cent. less than the market quotations of the same, the prospect of securing the property at the figure named is not encouraging. Before going into the subject of valuation, let us look at the records and see what it has been costing us for water for the past twenty years. From the municipal reports I have compiled the following table:

TABLE SHOWING WHAT CONSUMERS AND TAXPAYERS HAVE PAID SPRING VALLEY WATER WORKS FOR LAST TWENTY YEARS (1880-1899):

Year.	Daily consumption per million gallons.	From consumers.	From taxpayers (the city).
1880	12.68	$1,270,268 77	.....
1881	13.82	1,325,457 64	.....
1882	14.92	1,317,704 05	.....
1883	15.06	1,186,495 50	$34,240 40
1884	15.10	1,190,613 42	82,858 89
1885	17.05	1,180,618 93	81,938 29
1886	17.00	1,215,355 72	64,173 84
1887	19.11	1,260,063 66	70,797 53
1888	18.24	1,349,685 90	72,065 49
1889	16.85	806,733 65	42,775 30
1890	20.43	1,976,477 60	103,335 92
1891	19.33	1,516,282 54	88,565 68
1892	19.41	1,571,612 33	85,988 13
1893	19.06	1,560,358 43	61,228 15
1894	19.58	1,555,322 05	96,846 33
1895	19.91	1,550,688 67	137,235 72
1896	21.25	1,553,152 59	213,917 73
1897	23.77	1,499,093 48	228,087 07
1898	23.95	1,490,921 55	245,165 59
1899	25.01	1,546,939 02	240,878 77

Note—The discrepancy in receipts of years 1889-90 between other years was occasioned by an appeal by the water company to the courts from rates established by supervisors. The Supreme Court decided in favor of the water company. Hence a large proportion of 1890 receipts consisted of water bills of 1889.

The above table shows that in 1880 rate payers paid $1,270,268.77, and that the daily consumption was about twelve and one-half million gallons. It shows that in 1899, with a daily consumption of over twenty-five million gallons, consumers paid $1,546,939,02. The city paid nothing for water in 1880 for fire hydrants, etc., but paid in 1899 the sum of $240,878.77 for this purpose.

Although the daily consumption has doubled in the past twenty years water rates have not increased accordingly, for the reason that the current rate of interest has fallen, and this fact has been taken into consideration by the various boards of supervisors in establishing water rates annually. For example, the rates fixed in 1880 were upon the basis of yielding 8 per cent. per annum interest on about $14,500,000, while those for last year were supposed to produce an income on about $26,000,000 at the rate of 5 per cent. per annum.

I think it is generally conceded that 5 per cent. is not an excessive rate of interest. Individuals who invest their capital in enterprises of such a character as water works, railroads and similar projects are entitled to a reasonable reutrn on the amount actually invested. Real estate, the safest of all investments, must show either a strong speculative element or an income producing capacity (unless it is for residence purposes) of at least 5 per cent. per annum; otherwise it is not marketable. There appears, therefore, to be nothing unreasonable on the part of the Spring Valley Water Works in requesting that the company be permitted to charge consumers rates that will yield enough after paying interest on its bonds and operating expenses, to pay its stockholders dividends on the basis of 5 per cent. per annum. Nearly everyone, I think, admits this, and the only point over which there is any dispute is what constitutes the actual value of the company's property. There is some data upon this subject which, at least, is presumptive evidence, although it may not be conclusive.

In March, 1890, the board of supervisors appointed John F. Pope, an expert accountant, to examine the books of the Spring Valley Water Works, who, after an investigation of the same, reported that the amount actually expended up to that date was $18,840,202.37, and subsequent expenditures by the company up to January 1, 1900, according to statements filed with the board of supervisors (exclusive of taxes, interest, dividends and operating expenses), have run the cost of the plant up to $32,936,474.77. The company's liabilities at present are approximately $26,000,000, of which $14,000,000 is represented in 140,000 shares of stock, the par value of which is $100 per share. The remainder is in bonds, some drawing 6 per cent. and some 4 per cent. interest. The total market value of the stock and bond fluctuates somewhat, but is approximately $28,000,000. Colonel Mendell testified before the board of supervisors in 1880 that the most available source of supply next to the Spring Valley system was the Blue Lakes scheme, and that the cost to deliver twenty-two million gallons daily from Blue Lakes to San Francisco would be about $18,399,200, while in 1899 G. F. Allardt, an engineer of high standing and wide experience, estimated in detail the cost of the Blue Lakes system (thirty million gallons daily) at $33,529,723, and placed a valuation on the Spring Valley plant of $25,000,000.

WATER WORKS UNDER MUNICIPAL OWNERSHIP.

I give these figures principally to show that the present is not the only time when valuations of water works systems have been looked into, both as to the present system and also as to a water supply "elsewhere," and also to justify the estimated cost ($30,000,000) of works in case the city should condemn those of the Spring Valley Company, or should undertake to acquire any other. With this data at hand I invite especially the attention of taxpayers to the following table:

TABLE SHOWING WHAT CONSUMERS AND PROPERTY OWNERS WOULD HAVE TO PAY FOR FORTY YEARS IF THE CITY SHOULD INVEST $30,000,000 IN WATER WORKS:

	Income.	Expenses.	Balance.
Year.	From consumers (at present rates).	Sinking fund, interest, operating expenses, new construction and taxes.	To be paid by taxpayers (the city).
1st	$1,500,000	$3,050,000	$1,550,000
2d	1,500,000	3,023,750	1,523,750
3d	1,500,000	2,997,500	1,497,500
4th	1,500,000	2,971,250	1,471,250
5th	1,500,000	2,945,000	1,445,000
6th	1,500,000	2,918,750	1,418,750
7th	1,500,000	2,892,500	1,392,500
8th	1,500,000	2,866,250	1,366,250
9th	1,500,000	2,840,000	1,340,000
10th	1,500,000	2,813,750	1,313,750
11th	1,500,000	2,787,500	1,287,500
12th	1,500,000	2,761,250	1,261,250
13th	1,500,000	2,735,000	1,235,000
14th	1,500,000	2,708,750	1,208,750
15th	1,500,000	2,682,250	1,182,500
16th	1,500,000	2,656,000	1,156,250
17th	1,500,000	2,630,750	1,130,000
18th	1,500,000	2,577,500	1,103,750
19th	1,500,000	2,551,250	1,077,500
20th	1,500,000	2,525,000	1,051,250
21st	1,500,000	2,498,750	1,025,000
22d	1,500,000	2,472,500	998,750
23d	1,500,000	2,446,250	972,500
24th	1,500,000	2,420,000	946,250
25th	1,500,000	2,393,750	920,000
26th	1,500,000	2,367,500	893,750
27th	1,500,000	2,341,250	867,500
28th	1,500,000	2,315,000	841,250
29th	1,500,000	2,288,750	815,000
30th	1,500,000	2,262,500	788,750
31st	1,500,000	2,236,250	762,500
32d	1,500,000	2,210,000	736,250
33d	1,500,000	2,183,750	710,000
34th	1,500,000	2,157,500	683,750
25th	1,500,000	2,131,250	657,500
36th	1,500,000	2,105,000	631,250
37th	1,500,000	2,078,750	605,000
38th	1,500,000	2,052,500	578,750
39th	1,500,000	2,026,250	552,500
40th	1,500,000	2,000,000	526,250

I repeat that the attention of taxpayers is especially directed to the above table and to the figures which illustrate the effect of municipal ownership, because, generally speaking, taxpayers are rate payers as well as property owners. I submit that as consumers they will find no relief in municipal ownership, while as property owners their taxes will be increased to such an extent for the next forty years as to greatly depreciate the value of their property.

Under the head of "expenses" in the above table I have included annually sinking fund, $750,000; interest at 3½ per cent. per annum (it may be 3 per cent.), decreasing annually; operating expenses, $500,000; new construction, $500,000; taxes in other counties than San Francisco, and loss of taxes now paid by Spring Valley in San Francisco, $250,000.

Under the head of "income" I have allowed for annual receipts upon the same basis that Spring Valley is charging. No allowance is made for an increase in receipts, because it is fair to assume that even if the number of consumers increase the city authorities will continue to make occasional reductions in water rates whether the municipality owns the works or not.

Notwithstanding the fact that it is almost universally conceded that it costs the city more to operate, maintain and construct, I have allowed less for these items than it has cost the Spring Valley Water Works on an average during the past twenty years. On the whole, I think my estimate will be generally regarded as fair. The only element in it that may be doubtful is the one of cost. If it should be proven that $20,000,000 will give the city as good a water system as we now have, it requires only a little calculation to show that for forty years we would still be worse off than we are now and are likely to be under a continuance of private ownership, and at the end of forty years we would undoubtedly have to replace nearly the entire system, especially the hundreds of miles of pipes employed in bringing water from the mountains, if that is the source of supply, and also the distributing system about the city. This would mean another bond issue, probably as large as the first.

With the facts and figures before me I cannot help but conclude that no possible benefit can be derived from municipal ownership of the water works. I believe the electors will reach the same conclusions when they understand the situation and come to vote upon it.

Municipal control of the water works, as we now have, means that the city has no responsibility, no debt, no liability of any kind. The city establishes the rates which the private corporation is to charge for water, the only limitation being that they shall be such as will afford the company a fair and just return upon the investment. Municipal control means also that the city derives a revenue from taxes from the private corporation, which ceases with public ownership, and in exercising its control and espionage it helps to bring about a greater economy in the administration of the private corporation than would probably be the case without it, and certainly greater than officials would be likely to effect if they were conducting the enterprise for the city. Private ownership means that the corporation borrows, but never pays anything except interest on the debt. It issues bonds or sells more stock whenever money for permanent improvements is required. It renews its loans by another bond issue. It borrows for land purchases and new construction. The taxpayers and consumers buy from the private corporation water and pay enough to enable the company to pay taxes, operating expenses and interest only on its obligations. The private company owes always. Its stockholders and bondholders are its mortgagees. The individuality of its creditors changes, but the debt is always there. Its debt is a flat loan constantly renewed. Not so with the city. It borrows and must pay. The debt must all be liquidated within forty years. It is an installment loan. There is the annual installment of principal, also the interest on what is due, and also new construction, extension of pipe lines; also water rights, additions to pumping plants, land purchases, repairs, salaries and general expense; all to be provided for either out of income or taxes. Hence the difference between the amount to be raised annually by the city and that required under private ownership. Who will pay for this? The money must be raised from some source. Is the pleasure of ownership so great that the community will submit to this burden for the satisfaction of simply acquiring something which someone else owned when, after acquiring it, none of us will be benefited, perhaps not even after the forty years have elapsed? Are the taxpayers so impatient to owe that they will vote to saddle themselves with the Spring Valley Company's obligations for the pleasure of providing offices for tax-eaters? Are they so anxious to pay more taxes that they will purchase for $30,000,000 gilded bricks from "elsewhere?" Are politics so impure and officials so corrupt that they cannot be purified except by the expenditure of millions of dollars? I think when the question is put to a popular vote the electors will say emphatically NO!—"Merchants' Association Review," San Francisco.

San Francisco's Fight for Low Fares.

The city authorities of San Francisco have long endeavored to reduce fares on the street cars, the latest effort being a demand for 2 1-2-cent fares for all passengers compelled to stand and 5-cent fares for seated passengers.

The railway company contends its inability to secure experienced motormen and conductors for the extra cars needed during the rush hours of early morning and evening; Mayor Phelan suggested the possibility of drawing from the ranks of men employed in other vocations who could be spared from 5 to 6.30 p. m., but this is declared by the street railway men to be "amusing," impossible and dangerous. They also claim that such an ordinance would operate to yet further crowd the cars where possible, because by waiting for a full car all extra passengers could ride for half fare and that many people would permit an empty car to pass for the purpose of crowding into a full car.

Further they claim 2 1-2 cents to be less than the cost to transport a passenger and that the ordinance would mean confiscation.

These are novel ideas on both sides and the outcome will be watched with interest.

Richmond Traction Company.

The city of Richmond, Va., claims to have had in use the first electric street railway in the United States. Akron, O., makes a similar claim. As no dates are given by either claimant, "City Government" will let them settle the matter for themselves.

However this question is settled, it may be said there is no finer road bed in the country than that belonging to The Richmond Traction Company. And the new power plant, rapidly approaching a stage of completion, is of the most modern and complete type. Human genius could scarcely do more.

The road is officered by E. L. Bemiss, President; E. R. Williams, Vice-President, and Everett Waddey, Secretary. The management of the road is under the personal direction of Mr. Bemiss, who has infused into its employees, system and administration so much energy that it affords a striking contrast to surrounding institutions and customs of the city. The pulse-beat of a Southern city is only about half that of a Northern city, which is generally true of all the city's institutions, but there is an exception to be made in favor of the Richmond Traction Company, which proves the rule.

This is largely due to the management of Mr. Bemiss. In the first place he keeps in close touch with his men, and, although he is an extremely busy man, takes time to become acquainted with the entire force, which numbers several hundred. Some of his methods are quite novel. For instance, instead of promulgating general orders by bulletins, he takes the time to meet the men, a division at a time, there being three divisions in all. He can usually manage to see them all in a single day. Here he delivers and explains the orders and the reasons for them. It creates an esprit de corps which is seldom found among street railway employees.

The most acceptable recommendation an applicant can have is that from three or four of the men in service.

A system of merit and demerit marks, as well as offenses, which are followed by summary dismissal, are made known to the men. And the whole administration is conducted on such a fair and equitable basis that discipline and harmony are not difficult to maintain.

End of the D'Esterre Case.

The Supreme Court of the United States lately refused to grant a writ of certiorari for the reopening of the D'Esterre case. This finally disposes of the suit which was brought to compel the payment of principal and interest on certain bonds of the old town of Gravesend, which were issued to Coffin & Stanton of New York city during the municipal administration of "Boss" McKane of Gravesend. The municipality never received the price of the bonds, owing to the failure of Coffin & Stanton, who, however, raised money on these securities by depositing them with banks and trust companies as collateral for loans.

The suit has been a long one, and was of great interest, as it fixed the responsibility of New York city not only for this issue of bonds, but also for some $3,000,000 of bonds of suburban communities annexed to Brooklyn, and now a part of the greater New York, including New Lots, Flatbush, Flatlands and New Utracht. The decision of the lower courts that the bonds are valid obligations upon this city, therefore stands.

PUBLIC SAFETY.

Fire.

Annual Reports.

CHIEF HUMPHREYS,

Pittsburg, Pa., for the year ending Feb. 1, 1900, reports a total of 1,031 alarms, an increase of 81 over the preceding year. The gong alarms numbered 649, still alarms 382, false alarms 81.

The loss by fire amounted to $457,310.08, with an insurance paid, $369,176.84.

There were 16 persons, other than firemen, killed and 16 injured. During the year 116 firemen were injured in various ways while in the discharge of their duty.

* * *

CHIEF CANTERBURY,

Minneapolis, Minn., reports for the year ending Dec. 31, 1899, by a singular coincidence, the same number of alarms as Pittsburg, Pa.—1,031—of which 615 were sent in over the fire-alarm telegraph; 249 were still alarms; 124 by telephone, 31 by American District Telegraph, and the balance by special methods.

A salvage corps is maintained by the insurance companies doing business in the city and is under the management of Superintendent John T. Ruane. It has also been of great assistance in subduing small fires with small chemicals.

* * *

CHIEF CHARLES LAUER,

Of the Columbus, O., department reports that during the year there were 561 alarms, of which 437 were box and 124 still. Of that number 55 originated from gasoline, 66 from sparks, 31 defective chimneys, 24 false, 55 unknown causes, and the balance were scattering. The loss on buildings was $146,036.86, on contents $276,867.73. Insurance carried on buildings, $903,612.84; on contents, $629,503.10.

The total expenditures of the department were $262,492.98; total receipts, $197,146.01; overdraft, $65,346.97. The value of the equipment, $105,042; of lots, $104,875; of buildings, $185,300; total, $467,132.50. The department makes an average weekly inspection of houses of 1,274, or 66,248 a year, and 1,270 hydrants are inspected weekly. In the year 2,652 inspections of cisterns were made.

A new fire alarm box has been invented, and the inventor claims it will serve to prevent false alarms. There are two brass doors on the front of the box which have to be forced back to reach the key, and as they are being forced back they ring an electric bell inside the box, which draws the attention of everyone in the neighborhood to the person who is standing beside the box. Chief McAfee of Baltimore suggests an additional improvement. His plan is to have it arranged so that when the bell rings an electric light overhead will flare up, thus exposing the person sounding the alarm to view, and if the alarm turns out to be a false one, there would be little doubt about the arrest and identification of the culprit.

Fire Department Items.

The swinging gas jet is the cause of many fires. New York city's fire marshal recommends a prohibitive law, relating to the use of the jet, and its rigid enforcement.

* * *

On May 15 Myron N. Buck of St. Albans, Vt., became Chief of the fire department. He was appointed to fill the vacancy made by the resignation of former Chief J. C. Leslie.

* * *

Chief Croker, of New York, has warned all members of the fire department to keep out of politics. Firemen in that city cannot now belong to political organizations, and party leaders must hereafter look elsewhere for "heelers" and voters.

* * *

It is reported that the law enacted by the last session of the Ohio Legislature, creating the office of state fire marshal is defective. Governor Nash refuses to make the appointment on this account. The bill passed lacks a provisionary clause for an appropriation for its support.

* * *

The New York State Firemen's Assotion, which will meet at Syracuse from August 21 to 24, has received a reply from Admiral Dewey to an invitation to become the guest of the Association upon that occasion. The Admiral intimates that a favorable reply may be given in July.

* * *

The annual report of the fire marshal, New York, just published, shows that in 1899 the fire losses were nearly double what they were in 1898. There were 5,393 fires as against 4,239 in the previous twelve months, and the losses were $7,438,840, as against $4,155,191 during the preceding year.

* * *

Sub-Fireman O. H. Le Rett, of the Columbus, O., fire department, recently stopped a runaway horse, probably saving the lives of the four occupants of the carriage to which it was attached. For this act of heroism Chief Charles J. Lauer, on the order of Director of Public Safety Evans, promoted Le Rett from a substitute to a regular fireman.

* * *

Chief Swenie of Chicago has completed his annual report, showing that the value of the Chicago fire department property is $1,995,385, divided as follows: Buildings, $679,300; land, $361,575; apparatus, $954,510. The report states that there are 18,825 hydrants, 1,345 police boxes and 103 cisterns. During the year there were 98 accidents to members of the department—5 fatal, 30 severe, 4 serious and 59 slight.

* * *

The fire department of Cleveland now has a series of circulating libraries for each of the fire houses. The books are put up in specially prepared cases holding twenty volumes. A case has been sent to each house in the department. The officer in charge will act as librarian. When the books in a case have been exhausted they will be transferred to another house. The libraries contain many of the latest publications of fiction.

Examination of Probationers.

Chief Joseph Parris of the Washington, D. C., fire department, puts the probationary members through a course of sprouts, in addition to the regular training, which soon demonstrates whether they have the stuff in them of which firemen are made. The list of questions and answers which the chief employes,—several hundred in number,—are adapted to the needs of each engine company, comprehensive in scope, pertinent to the subject and calculated to be the most sensible kind of a civil service examination.

A probationer must pass a satisfactory examination before he can become a permanent member of the department. This, of course, requires a thorough famliarity with all appliances used in the extinguishment of fires, what is to be done in emergency cases and a perfect understanding of the rules and regulations of the department.

Fire Alarm Damaged by Electrolysis.

Gas and water mains have suffered from electrolysis for a long time, but the Indianapolis fire department is the first to report any damage of this kind to the fire alarm telegraph. Chief Barrett of the department of that city reports that there have been repeated recent failures to sound alarms when boxes have been pulled. Upon investigation the boxes have been found in perfect order. But when the cable was examined the lead pipe was found to be punctured in several places and there were other evidences of disintegration. So much of the cable service seems to be affected that the situation is alarming. The tower men in the court house have been ordered to keep a lookout and to act on the theory that the alarm system cannot be depended on. This condition will enter into the argument for a new alarm system.

Doorknockers on Engine Houses.

There is placed upon the front door of every new house built for the New York Fire Department an old-fashioned doorknocker. The first house thus equipped was built five years ago for the company of Engine 57, the fire-boat New Yorker, on the wharf where the boat is moored, at the Battery. There are now in the city a number of fire houses with doorknockers. These are alike on all the houses which they appear, the design selected being of a simple, colonial style, rather elongated in form.

The doorknocker is larger, more conspicuously placed and more likely to be seen than the plate of an electric push-button, and nobody approaching the door at night, as for example, a citizen desiring to give an alarm, could fail to see it. No time is lost in looking for a bell; and inside the house there is no possibility of even momentarily confusing the sound of the doorknocker, as there might be in the case of a doorbell, with that of the gongs upon which the alarms are sounded.

So it comes about that while everything within the modern fire house is up to date to the last extreme limit, there is placed upon its door outside, as being the thing best adapted to its use there, an old-fashioned brass doorknocker.

Boston's Immunity from Heavy Fire Loss.

In a recent editorial the Boston "Herald" commented on the heavy loss of property by fire in recent years, with an observation as to the exceptional conditions prevailing in that city. It said:

"In New York, Philadelphia and Chicago—a list which could be greatly prolonged by adding smaller cities, the insurance companies have been called upon to pay in fire losses more money than they have taken in in fire premiums, which would have indicated bad business operations even if it had been possible for them to have conducted their affairs without the payment of a single cent or costs.

"The one marked exception to this rule of general disaster has been the city of Boston. While there has been this epidemic of fires, involving the destruction of property to the amount of scores of millions of dollars, our losses, while sufficiently large when judged of from a European standpoint, have not been excessive, and if, as some have reason to think, fire losses proceed in waves, when the good times come we should in this city show remarkably favorable results. The reason for this, as it seems to us, is that we are gradually beginning to realize the results of methods which have been in force for several years past in the line of fire prevention. One of the most potent causes of large fire losses is the great area and height of buildings; but there is no city in the United States in which the building laws are in these respects as restrictive as those of Boston. No building containing merchandise, no matter how built, can be raised to a greater height than 100 feet; no building containing merchandise, no matter how built, can have a greater area than 10,000 square feet. Unless such buildings are thoroughly fireproof in construction they cannot have a greater height than 70 feet, or greater area than 8,000 square feet.

"These, we say, are restrictions of immense importance, and yet one would have to look beyond the Atlantic to find another city in which such exacting conditions exist. In the matter of our water supply, we have a general system which, in size of pipes and pressure, can be favorably compared with that of any of the large American cities, but in addition to this we have a secondary water supply, delivered under high pressure, which is used entirely for automatic sprinklers and interior fire defenses, Boston being the only city in the country which has adopted this method. More than this, we have through a part of our city the pipes laid for a salt water supply, which can be easily connected and made available for a large area in our business district.

"Another factor in the recent immunity of Boston from large fire losses is to be found in the administration of our fire department. Col. Henry S. Russell, who has now been for some five years the fire commissioner of this city, may not have pleased certain of the municipal political leaders, but there is not the least question that, for administrative ability, we have not had his superior, and it may be doubted whether his equal exists at the head of any of the departments of the United States. He has been so manifestly the right man in the right place that, in spite of adverse political administrations and a great deal of adverse criticism on the part of those who are desirous of dispensing official patronage, he has been maintained in his place, and has felt free to do whatever he believed to be his duty.

"Combining all these favorable conditions, it is not strange that, for the last two years, Boston has not alarmed those engaged in the fire insurance business by the magnitude of its fire losses, the rates of insurance have not been high with us, but, everything considered, they have been adequate, which is all that they need to be ;and hence, while in the other great cities of the country manifest need has forced the rates of premium to very much higher levels than they have previously occupied, Boston's fire record has been such as to make it evident that there is no ground for any widespread increase in the amounts paid by our citizens for fire insurance upon their property."

Chief Hale's Plans.

Chief George C. Hale of the Kansas City fire department seems to be the only probable representative of the American fire departments at the International Tournament to be held in Paris next August. The zeal with which he is pushing the training of the men and team which are to make the trip bids fair to win many laurels for Uncle Sam's fire fighters.

The Pompier crew and team have developed marvelous work since the spring weather has permitted them to have daily practice. With the combination of the quick hitching team and the famous dapple-gray team from Westport and the Pompier men, Chief Hale will take to Paris an outfit which will be hard to equal and still more difficult to excel.

The chief will take one of the finest steamers ever built. It will be gold and silver mounted and will throw a stream 200 feet high. In addition to these he will carry a number of models, showing all the latest inventions pertaining to fire departments.

Fire Department Notes.

Chief Hahn of the Ottawa, Ill., fire department has corrected the statitsics concerning his department, appearing in the April number of "City Government." The report should have read as follows: Property endangered, $236,210; amount of insurance, $145,700; loss, $69,703; value of apparatus and horses, $4,000; fire alarm system, $3,300; total valuation of equipment, $8,600.

* * *

A city ordinance at Springfield, Mass., grades the pay of firemen as follows: Drivers, tillermen, linemen, laddermen, enginemen of chemical engines and hydrantmen, each who is or may be serving his first year of service, $2 a day; each who is or may be serving his second year of service, $2.10 a day; each who is or may be serving his third or any subsequent year of service, $2.50 a day.

* * *

Something new in fire alarms has been invented by the chief of the Kansas City fire department. On a telephone circuit connected with the headquarters there are to be placed the usual thermostats, which give an alarm whenever the temperature in their neighborhood becomes dangerously high. The new departure comes from the addition of automatic phonographs to the other apparatus. By their agency, when the thermostat gives an alarm, the phonograph proclaims over the telephone line the exact location of the fire.

New Glasgow Fire Station.

The following details of a new central fire station that has been opened in Glasgow, Scotland, may be of interest:

The new building, which is described as one of the finest in the kingdom, covers an area of 3,300 yards, and has involved a total expenditure of over £60,000, the site costing £22,750 and the building about £40,000. The station has two frontages—one in Ingram street and the other in High street—that in Ingram street, four storys in height, being the principal. On the ground floor to the right of the entrance are the watch-room and the engine-house, with accommodation for four machines. The offices are to the left, and comprise the chief officer's room, officers and clerks' rooms, etc. Immediately to the rear of the engine-house, and opening into it, are stalls for eight horses; and behind this is the fodder-house, spare stables, machine and harness rooms. On the first floor, over the engine-house, are two duty-rooms, provided with sliding poles. A passage across the roof of the stable communicates with the recreation-rooms. The remainder of this floor and the floors above are occupied by the officers' house. The engine-house walls are lined inside with a beautiful selection of Grecian marble and polished granite, and the floor is laid with oak blocks.

The High street building is five storys in height. The four upper floors are occupied by the firemen and their families, the ground floor being occupied as shops. At the south side of the courtyard is a block of buildings containing on the ground floor rooms for spare machines, workshops for boot-making, hose-repairing, engineering work, joinering, coach-painting and plumbing; and on the three floors above are the houses for the firemen and their families. Behind this building is situated the children's playground. Facing this block on the other side of the court-yard a range of one-story offices is built, comprising wash-houses, laundry, drying-room, smithy, oil store, electric shop, &c.; in the south-west corner of the courtyard is the hose-drying tower rising to a height of 90 feet, having on the top a test-room for all fire alarm, telegraph and telephone lines; adjoining is the gymnasium, 55 feet long and 25 feet broad, and underneath is a store for wood and iron. In every fireman's house is a bath, supplied with hot water from a steam boiler, which also supplies the water for heating and for domestic use throughout the station. The buildings throughout are lit by electricity. All pipes, drains and electric light lines, also the telegraph, telephone, fire alarm and house bell connections, are contained in a subway which connects all the buildings. The elevation to Ingram street is of handsome design, well broken up with oriels, gables, pilasters and carving, but not overladen with ornament, polished granite being carried to the first cornice. Above this Locharbriggs red sandstone is used. The elevation to High street is built of the same materials as that to Ingram street, but is less ornate in character. The station being built on the barracks principle, access to the firemen's houses can be had only from the Ingram street entrance, and thus every person entering or leaving the station is under observation from the watch-room. —"The Surveyor," London.

Police.

National Convention of Police Chiefs.

The annual gathering of Chiefs of Police of the United States and Canada is always a notable event, but it was of more than ordinary importance this year as it was to meet in the Queen City, whose genial Superintendent of Police, Colonel Philip Deistch, was to be the host. The session lasted from May 8-11.

It is needless to say they had a good time. They had a profitable time as well. Perhaps the most important piece of business transacted was that which authorized the necessary steps to be taken for the transfer of the National Bureau of Identification to the control of the United States Government. It was argued that under Federal control there would be a better opportunity to extend its usefulness to a larger number of cities, especially the smaller ones.

The convention will be held in New York city next year. The date was fixed for May 28 so as to permit the visitors to review the annual inspection of "the finest" of New York.

Toledo's New Jail.

The city of Toledo, O., has completed its new jail, costing over $100,000. It is said to be the finest in the state.

The building is a model of its kind and embodies in its interior arrangements the latest and best of ideas in penal institutions. Over two hundred offenders against the majesty of the law can be taken care of at once, each in a different cell, though now the average number of persons is scarcely twenty at one time.

Each cell has complete and up-to-date sanitary appliances, is light and airy and the corridors are not such as fancy and fiction have been wont to ascribe to a jail.

For any inmate to make a successful attempt at escape will be a practical impossibility, as the turnkey, from his point of vantage, can command a view of each and every cell, and besides the cells are locked from that position, and not each cell separately. Such a means prevents any prisoner from releasing a fellow inmate. And in going to trial, the ward of justice gets no glimpse of freedom, for as he leaves his cell he is conducted through an underground passageway to the court house.

But should the prisoner prove fractious he will soon find that the jail contains other than pleasant features, for an A1 dungeon is on hand, where he can be put and where the light of day never penetrates.

Another good feature of the arrangements is the provision for the separation of the youthful from the old and hardened lawbreakers, and also the excellent provisions for the comfort of those who are detained as witnesses.

The hospital will be on the top floor, while the culinary department will occupy the basement and the food will be taken upstairs by a dumb waiter of approved design.

But the most pleasant arrangement of all is the total separation of the sheriff's living quarters from the jail proper. He will occupy apartments overlooking Court House Park, the rooms of which are large and high and in every way desirable.

Police Items.

Chief Cleary of Rochester, N. Y., has given orders to arrest corner loafers and the hard cider and other gangs.

* * *

The roundsmen and patrolmen of the Saginaw, Michigan, force had their salaries raised recently, so that they now receive $60 and $57.50 per month.

* * *

An exchange reports that the Police Commissioners of Buffalo are seriously considering a plan whereby the bicycle corps will be provided with automobiles instead of bicycles.

* * *

The city of Rochester, N. Y., has at last taken rank with larger cities and added precinct station houses to the administration buildings of its police force. Chief Cleary is to be congratulated on obtaining what he has long desired and needed.

* * *

Chief Harrison of the Akron, Ohio, force has issued orders that all clairvoyants, palmists, and fortune tellers now doing business in Akron must get out or they will be arrested, under the provision of the law passed by the last legislature governing such people.

* * *

Chief Tyler of the Columbus, Ohio, department reports that a total of 4,010 arrests were made during the year. Stolen property amounting to $16,952.54 was recovered, or 79 per cent. of the amount reported stolen. Patrol wagons made 5,563 runs, and 3,860 arrests, traveling 8,167 miles; the ambulance made 1,448 runs, and removed 1,324 persons. The expenditures of the department were $168,376.85, and the receipts, $134,156.17; overdraft, $34,220.68. The assets of the department are $59,490.50.

* * *

Chief Kipley of Chicago has issued an order prohibiting smoking by policemen in uniform whether on or off duty. The order is addressed to commanding officers and is: "Reports have reached this office that police officers are seen smoking in the public streets and on cars while in uniform. I want officers to distinctly understand that smoking in public while in uniform, on or off duty, is a violation of one of the rules of the department. Positive information has reached me that commanding officers are passing by without apparent notice officers in uniform smoking in the public streets. Commanding officers must report all violations of this rule. It matters not to what precinct the offending officer belongs, report him. The first officer caught smoking while in uniform in the public streets will be dismissed from the force.'

One-Cent Fares at Troy, Ohio.

A hotly contested fight between three proposed electric lines for the right of way over the streets of Troy, Ohio, was brought to a close last week by the granting of a franchise to the Dayton and Troy Electric Railway Company, which is said to be a part of the Southern Ohio Traction Company's system. Before the franchises were granted the companies were asked to state the rate of fare that would be charged within the city limits, and the competition which resulted was very fierce. At first a 3-cent rate was offered. This was afterwards reduced to 2 cents. Later the company mentioned offered a rate of 1 cent, to hold good during the life of the company, which is twenty-five years. The County Commissioners of Miami and Montgomery counties have already granted the required franchises, and the work of constructing the new line will be begun at once.—"Street Railway Journal."

Health.

Tuberculosis in Norway.

In November of last year Dr. Claus Hansen, of Bergen, delivered a lecture before the Storthing, at Christiania, on the causes of tuberculosis and the fight against it. He stated that during the thirty years of his own experience consumption had increased in the Bergen district 80 per cent. In the year 1898, 54.5 per cent. of all deaths between 15 and 30 years of age were caused by tuberculosis, and statistics show that about 7,000 of the inhabitants of Norway die every year of this disease. In England, he continued, they have succeeded during the last fifty years in reducing one-half the number of tuberculous cases, and physicians attribute this to the increasing cleanliness in English home life and the erection of consumptive hospitals. The foremost endeavors in fighting tuberculosis should be to agitate for greater cleanliness in general; particularly should efforts be directed against the habit of expectorating.

Statistics of consumptive sanatoriums in Germany show that 66 1-3 per cent. of the inmates were able to work the first year after the cure, 60 per cent. after two years, 45 per cent after three, and 35 per cent. after four years. On an average it is estimated that 50 per cent. of the patients in sanatoriums have their ability to work lengthened by one year. The advantages of public sanitoriums for consumptives are so great that the German invalid-insurance companies erect these institutions simply for reasons of economy.

Baltimore's Free Bath.

On May 17 Henry Walters of Baltimore, Md., formally turned over the keys of the handsome and well equipped free-bath house, which had been erected at his own expense, to President Wilmer of the second Branch City Council, acting for Mayor Hayes, who is still confined to his home with a fractured leg.

The new bath-house is situated in one of the most thickly populated sections of the town, and should prove a God-send to thousands who will doubtless avail themselves of the opportunity of securing an invigorating bath. The building itself at first sight would appear small, but a thorough inspection of the interior will show that there are accommodations for as many as will bathe. There are no plunges. All bathing will be by showers, but these are so admirably arranged that no fault can be found. The idea in building the place was to accommodate a large number of people, and the lines upon which the interior arrangements have been made have carried out this plan in a superior manner.

The building is called a two-story structure, but in reality it is only one story, with a large basement. There are two entrances, both situated on High street. The front of the building is of handsome Kibbey brown stone and Pompeiian brick. A miniature gallery surmounts the roof, and upon this stands a flagstaff. The vestibules are both of Tennessee marble, while the doors are of oak with hardwood finish. The building is 40 feet front by 70 feet depth, although from the way in which it is built it would not at first sight seem so large.

On the main floor fronting the street is the office. This is fitted up in antique oak with all the accessories such as lock-

boxes, drawers, hooks, etc. The keys of the bathrooms will be kept in the office and distributed from there. Outside of the office are two large waiting rooms, about 16 by 18 feet each. These are filled with chairs and benches. Back of these are the baths and attendants' rooms. There are 30 baths in all.

Each bathroom is fitted up with a Genestrom rain-bath appliance, which is so arranged that the shower can be instantaneously brought to any desired temperature. This result is accomplished by simply turning brass spigots and watching the thermometer that accompanies each machine. The bathrooms are of slate with brass and nickel furnishings. The place is fire-proof throughout.

The apparatus for the ventilation of the building is splendidly contrived. There is a 60-foot stack at the rear of the building, which leads to conduits in the basement. Through these conduits the air in the bathrooms is drawn off continually and fresh air forced in. By this means the place will be continually purified by a stream of fresh air. Over the baths there are large skylights which make the place extremely bright.

From the attendant's room to the basement there is a chute which is used for sending towels to the laundry. That the supply of towels will be large and ample is assured by the means provided for laundry work. There are eight large metal washtubs in the basement, all fitted up with steam pipes, and in these the washing of the institution will be done. There will be no necessity for waiting until the towels dry naturally, as a drying plant occupies the rear of the front basement room. This will easily hold 500 towels, and is guaranteed to dry them instantly. The racks are perpendicular and slide in and out.

There are two boilers in the rear of the basement. These are arranged for high and low pressure and are well calculated to supply all the steam necessary for heating purposes. Those who have charge of the Walters bath are sanguine that as many as come can be accommodated there.

Street Railways.

Paris Underground Railway Employees.

By Edmund J. James, Chicago.

By a law passed March 30, 1898, the city of Paris was authorized to proceed with the construction of a system of underground railway lines, to be known as the Metropolitan Railway and to be operated by electricity. The city was permitted to excavate the tunnels, make the cuttings, and build the viaducts—at the point where the railway emerges from the ground, as it will in one or two places. It is not permitted, however, to lay the tracks or work the road. This part of the enterprise must be intrusted to a working company, which is to lay the tracks, construct the electric plant and stations, and operate the road. The city receives, roughly speaking, one-third of the gross income from the sale of tickets, as rent for the part of the road which it constructs and for the right-of-way. The company takes two-thirds for its portion. The conditions which the city imposed upon the company in regard to the treatment of its laborers and employees are extremely interesting, and indicate the high-water mark attained by modern cities in this respect. The more important of these conditions are contained in the following provisions of the agreement between the city and the traction company:

1. The salaries or wages of the workmen and employees shall be paid fortnightly, and shall in no case be less than 150 francs per month.

2. One full day of rest or two full half-days shall be granted each week to the personnel.

3. An annual vacation of ten days, with full salary, shall be granted to all employees.

4. The full salary shall be paid during the perods of military instruction.

5. Days of sickness, properly certified by the physician appointed by the manager of the fund, shall be paid for in full, without any deduction, during the period of at least one year.

6. In case of accident happening during work and resulting in a temporary incapacity, the workmen shall receive their entire wages until a complete recovery, without prejudice to the indemnity which shall be due to them in case of final disapility, either total or partial.

7. The workmen employed in the enterprise shall be insured against accident at the sole cost of the leasing company, which shall not under this head make any deductions from the wages due. Moreover, whatever may be determined in regard to the responsibility for an accident, the leasing company shall always be directly responsible to the victim for the payment of the indemnity.

8. The administration of the city shall always have the right to prescribe such measures of safety and health as may be considered necessary.

9. A written commission shall be delivered, under the form of a wage contract, to every adult employee or workman, of either sex, who may have completed twenty-four months of service.

The leasing company is required to observe strictly the conditions above enumerated, in regard to the labor of its employees, under penalty of forfeiture of the lease. The leasing company binds itself further to furnish to the working personnel in its employ deposit books of the national pension fund to establish a free medical and drug service to insure its laborers and employees against accidents. It is an interesting fact that the introduction of these provisions into the lease did not give rise to any prolonged negotiations between the parties concerned, nor did it excite any considerable discussion either in the City Council of the Parliament. In fact, the leasing company agreed readily to all the conditions, and indeed proposed itself some of the clauses favorable to the laborers and looking to their comfort and safety.—"American Journal of Sociology," Chicago.

Automotor Street Railway Franchise.

The city of Jacksonville, Fla., has recently granted a franchise to an automotor street railway company with the following conditions and considerations to the city: For and in consideration of the building, operating and maintaining of a pleasure park at some easy distance to the city of Jacksonville, and to build, construct, operate and maintain a street car service over the lines herein specified, for the perod specified, and for the operating and maintaining a pleasure steamer or steamers, to be run on the St. John's river from the point designated in this ordinance to and from said pleasure park; all of said improvements to be made at the earliest possible period, and to be in operation within twelve months from the grant of this franchise over the streets hereinafter set out, the amount to be expended to be not less than $100,000, and in view of the fact of this expenditure of money in and near the city of Jacksonville and the addition to the city of the advantages of the pleasure park to be built by the parties seeking this grant of street privileges by the city of Jacksonville.

Other conditions of the grant are that it shall exist for the term of thirty years, that the work shall begin within six months from the grant, or the franchise shall be null and void; the work shall be completed within twelve months or the grant shall be void; provided that the promoters shall have sixty days in which to deposit or give a guarantee bond for $5,000, to be forfeited to the city if the conditions of the franchise shall not be complied with. The cars to be used shall be automotor cars, constructed without wire or poles to mar the streets; the company is required to pave between the tracks of their line within the city limits and for two feet on each side of the tracks, when the city shall decide to pave such streets as the tracks may be laid upon; the grantees are also required to pay to the city the pro rata cost of nine feet wide of such paving on such paved streets as they may operate their cars upon, under penalty of forfeiture of the grant.

After the expiration of ten years the grantees shall pay into the city treasury one per cent. of their gross receipts from the operation of the street car line, and after fifteen years, two per cent. of such gross receipts. The maximum fare that may be charged within the city limits for continuous passage shall be five cents.

The Color Line in Street Cars.

The following ordinance has been introduced in the Augusta, Ga., Council for the separation of the races:

"Be it ordained that the Augusta Railway and Electric Company be and it is hereby required to provide separate accommodations for the white and colored passengers by reserving the two front seats for the white passengers and the two rear seats for the colored passengers, the intervening seats to be filled by the white passengers from the front and by the colored passengers from the rear; and when the seats of the car are filled in the manner aforesaid, then the conductor and motorman of said cars are to refuse to admit other passengers.

"It is further ordained that any passenger refusing to be assigned to seats in accordance with the foregoing regulations shall be deemed guilty of a violation of the ordinance, and for said violation shall be, on conviction, before the recorder, fined in a sum not to exceed —— dollars, or sentenced to work on the public works of the city for any time not exceeding —— days, or either, in the discretion of the recorder.

"It shall be the duty of the conductor and motorman to see that these regulations are carried out, and to this end it is made the duty of the police to arrest and bring before the recorder any person or persons violating this ordinance."

PUBLIC WORKS.

Water.

American Water Works Association.

The twentieth annual session of the American Water Works Association was held at Richmond, Va., May 15-18. There is so much of historic value, both of Colonial days and of a later date, clustering around the city of Richmond that it called out a larger number of delegates than has been in attendance for many years.

The papers presented were numerous, covering the whole field, full of practical interest and value, eliciting much discussion. One of the most interesting was read by E. B. Weston, C. E., giving a full description of the construction and operation of the Norfolk, Virginia, filter plant. A digest of the paper will be found in this number.

The welcome which was extended to the visiting delegates and the entertainment given was typical of Southern hospitality. Mr. Charles E. Bolling, superintendent of the Richmond water works, was a most genial host and made every one feel at home.

On Thursday the election of officers was held and the following were the successful candidates:

Charles E. Bolling, Richmond, Va., president.

C. M. Priddy, Denver, Col., first vice-president.

William Himrod, Erie, Pa., second vice-president.

Thomas N. Hooper, Davenport, Ia., third vice-president.

C. H. Campbell, Charlotte, N. C., fourth vice-president.

W. H. Laing, Racine, Wis., fifth vice-president.

Peter Milne, New York city, secretary and treasurer.

It was decided to hold the next session of the association in New York city.

Cincinnati's Filtration Plant.

Chief Engineer Bouscaren, who is in charge of the construction of the large filtration plant now building for the purification of Cincinnati's water supply, in a recent letter to the editor of "City Government" said concerning the proposed system:

"We have decided upon the mechanical system of filtration for the purification of the new water supply from the Ohio river, here. When the river water is turbid, which condition prevails for nine or ten months in the year, the principal features of the system will consist of:

"(a) Subsidence for a period of two or three days in settling reservoirs operated by alternate filling and drawing, one reservoir being filled whilst the other is being emptied, and the effluent water being taken from the surface.

"(b) Use of a chemical reagent capable of producing a gelatinous precipitate which will arrest the impurities of the water on and near the surface of the filters.

"(c)) Supplemental subsidence after coagulation for a period of six to one-half hours, according to the degree of turbidity of the subsided water, in coagulating basins operated on the principle of continuous flow, the inflow at one end being kept equal to the outflow at the other end.

"(d) Application of the coagulant at two points, viz., as the water enters the coagulating basin and just before its delivery to the filters.

"(e) Filtration by gravity through sand at a uniform rate approximating 100 to 125 million gallons per acre daily.

"(f) Washing the sand in the filters by means of filtered water supplied from special pumps and flowing upward through the dirty sand while said sand is being loosened by mechanical agitation.

"When the river water is comparatively clear, subsidence will be omitted and the river water will be delivered directly on the filters.

"The subsiding reservoirs are the only part of the purification plant under construction now. Plans for the filters have not yet been made."

New York's Water Supply.

Controller Coler and Water Supply Commissioner Dalton of New York city, have had rival experts in the field for some time past, studying the situation. The reports of the two experts have appeared almost simultaneously, and, although the engineers have followed different lines, in several important particulars they quite agree.

They agree in naming five years the limit of safety with present conditions and sources of supply, allowing for a normal annual increase in consumption.

Mr. Dalton states that last year's rainfall in the Croton watershed was 2.63 inches below the average, 18.14 inches below the maximum, and but 7.04 inches above the minimum for the past thirty-four years; while Engineer Freeman, aided by Cornell University experts in what are declared to have been the most thorough researches ever made, finds that the actual flow has for years been over-estimated by 10 per cent.—in other words, that we own 10 per cent. less water than we supposed we did.

Mr. Dalton has secured, as an early expedient, approval of plans for a new storage reservoir of 9,000,000 gallons capacity on the Cross River branch of the Croton, and has applied for authorization of a bond issue. As a permanent remedy he insists that we must at once secure additional sources of supply or institute further and severe restrictive measures to reduce the per capita consumption.

New York is thus confronted with both conditions and theories, emanating from rival sources of scientific research, which agree in their main propositions. But there is comfort in the Freeman statement that it would be possible for the city to acquire an augmented supply along the Ramapo lines at less than $25 per million gallons, as against $70, as contemplated by the repudiated contract with that company.

PUBLIC WATER SUPPLIES FROM DRIVEN WELLS.

PART III.—SIZE OF DRIVEN WELLS—SPACING OF DRIVEN WELLS—TABLE SHOWING SIZE, DEPTH AND SPACING OF DRIVEN WELL PLANTS IN VARIOUS LOCALITIES — PROSPECTING FOR A SUPPLY—METHODS OF SINKING.

By E. Kuichling, C. E.

SIZE OF DRIVEN WELLS.

The diameter of a driven or drilled well is generally governed by its projected depth and anticipated yield. In earthy strata the well is usually formed by sinking an iron pipe or casing to the required depth, or until the friction upon its exterior surface becomes so great as to interfere seriously with further progress. This limit obviously depends on the nature of the soil, the size and weight of the pipe, and the method of sinking, but it is commonly reached at depths of from 400 to 1,000 feet; hence for lesser depths the tube or casing is always of uniform diameter, while for greater ones a smaller pipe is driven inside the first until the work is again arrested by friction or unwieldiness, whereupon the process is continued with still smaller sizes. The same principle also governs the drilling or boring of deep holes in rocky strata, as the weight of the tools and rope eventually becomes excessive; and to indicate briefly the practice in these respects, reference is made to the long table given in the foregoing. A few additional memoranda may, however, be of interest in this connection, and the following details are therefore appended.

In the great test boring for minerals which was completed in 1892 at Schladebach, Germany, to the depth of 5,735 feet, the diameter varies from 11 inches at the top to 1.3 inches at the bottom. For a well at Galveston, Tex., designed to reach a depth of about 3,000 feet in earthy strata, the size of the casing ranged from 22 inches to 6 inches.* In a well sunk in 1888 to a depth of 2,876 feet at Alma, Mich., the upper 220 feet was cased with 8-inch pipe, after which came 560 feet of 6-inch pipe and 1,580 feet of 4-inch pipe, the latter extending for a short distance into a layer of solid rock through which the boring was continued without casing for an additional depth of 516 feet.† In the famous well at St. Louis, Mo., which was begun in 1849 and finished in 1854, the first 30 feet consisted of an ordinary curbed excavation a few feet in diameter, and at its bottom a 9-inch pipe was sunk for 219 feet, reaching into the compact rock; this was followed by a drill hole 5.5 inches in diameter for 731 feet, and then by a 3.5-inch hole for 1,219 feet more, thus giving a total depth of 2,199 feet. At the deep well in the chalk at Southampton, Eng., completed in 1854, the diameter was 13 inches for 563 feet and 7.5 inches for 754 feet; and at the Grenelle well in Paris, which has a depth of 1,798 feet and was in process of construction from 1833 to 1841, the diameters were 12 inches for 50 feet, 9 inches for 1,050 feet, 7.5 inches for 200 feet and 6 inches for 498 feet.

From the aforesaid table, it will be seen that driven wells of moderate depth for the supply of towns range from 2 to 12 innches in diameter; but unfortunately their yields differ so widely, even when the wells are of practically equal depths in similar strata, that no reliable rules for practice can be established. In some apparently comparable cases a 4-inch well will not give appreciably more water than can be obtained from a 2-inch tube of the same depth, and in others the yield of the former is for an excess of what might be expected from the ratio of its sectional area to that of the latter. Similar anomalies are likewise found in comparing the yields of wells of all other sizes in strata of the same character. If, however, the investigation is limited to tubular wells which are sunk from 40 to 100 feet deep into thick and extensive deposits of saturated sand or gravel, the writer has found from the comparison of many such data that the relation of the probable minimum yield to the diameter may be expressed by: $Q = 7200d + 80d^3$, where (Q) is the minimum yield in gallons per day and (d) is the diameter of the pipe in

*"Engineering News," Aug. 11, 1892.
†"Engineering News," March 30, 1889.

inches. According to this formula we will have: For a diameter of 2 inches a probable minimum yield of 15,000 gallons per day; 4 inches, 33,900; 6 inches, 60,500; 8 inches, 98,600; 10 inches, 152,000; and on comparing these figures with the average and minimum values given for such cases in the above table, it will be seen that a tolerable agreement exists. It should be noted that this formula makes no pretension to accuracy further than as above indicated, and it has been given here mainly in the hope that its criticism by other engineers will elicit an abundance of data from which a better expression can be deduced.

In view of these considerations, it is evident that the economics of construction in any particular case can be determined only after a thorough knowledge of the local conditions has been gained by ample experimenting; and hence little more remains to be said in this respect than to mention that in borings through rocky strata a diameter of less than 5 or 6 inches is rarely used, for the reason that the smaller tools are liable to be broken in deep holes, whereas in earthy deposits the matter of breakage is largely eliminated, and the size of the pipe becomes a subordinate factor the usual processes of sinking. For driven wells of moderate depth in sand and gravel, the most recent practice in municipal plants still indicates a range of diameter from 2 to 10 inches, but the tendency appears to be in favor of 6 and 8-inch tubes, especially where large yields are required. The sizes adopted in a number of cities having plants of this character have already been given above,*

*See page 128.

and further reference thereto will be made subsequently.

SPACING OF DRIVEN WELLS.—An important consideration in planning a system of driven wells is the proper distance between the tubes to avoid undue mutual interference. Here again no fixed rules can be given, as the spacing is largely affected by the size of grain, extent and thickness of the water-bearing material. In rocky strata through which the water flows mainly in irregular seams or fissures, theoretical speculations as to distance apart are generally useless, and the only way of determining such a problem satisfactorily is by practical trial. On the other hand, in homogenous sandy formations a mathematical treatment of the question is possible, but unfortunately the data on which such formulas are based are still too scanty to warrant much confidence in the computed results. Furthermore, the composition of extensive natural deposits of a permeable character is generally far from homogeneous, whence it becomes necessary to provide the said formulas with empirical coefficients adapted to different classes of material; and as these factors are likewise of doubtful validity, it follows that the spacing of driven wells must still be governed in large degree by a careful study of the practice in similar cases. For this purpose all of the local peculiarities should be taken into account, but as a full description of each plant for which the necessary details are available will greatly exceed the limits set for this article, only the essential features of a moderate number of recent plants are given in the following table.

TABLE II., Showing Size, Depth and Spacing of a Number of Driven Well Plants in Various Localities.

LOCATION.	DIAMETER OF WELLS. INCHES.	DEPTH OF WELLS. FEET.	NUMBER OF WELLS IN PLANT.	NUMBER OF ROWS OF WELLS.	DISTANCE APART OF ROWS. FEET.	DISTANCE APART IN EACH ROW. FEET.	NATURE OF WATER-BEARING STRATUM.	REMARKS.
Brooklyn, N.Y.	2	30 to 42	100	2	14	14	Sand	Regular and in straight lines.
" " "	2	27 to 73	183	3	17 & 36.5	13	"	" " " "
" " "	2	33 to 56	110	2	18	16	"	" " " "
" " "	2	33 to 56	130	2	18	16	"	" " " "
" " "	2	29 to 53	150	2	18	16	"	" " " "
Ft. Worth, Tex.	2	24	95	2	6	18	Gravel	Staggered in straight lines.
Lowell, Mass.	2	45	70	2	12	25	"	Regular and in straight lines.
" "	2	45	50	2	12	12	"	" " " "
" "	2.5	27 to 40	169	2	12	24	"	Staggered in straight lines.
Schuyler, Neb.	2.5	50 to 67	26	2	4	33	"	Regular in straight lines.
Brooklyn, N.Y.	4.5	45	62	2	24	75	Sand	Staggered in straight lines.
" " "	6	42 to 75	13	2	70	50	"	Irregular spacing, staggered.
" " "	6	48 to 53	12	2	24	76	"	Staggered in straight lines.
Columbus, O.	6	75 to 80	34	1	--	32	Gravel	Regular.
	6	60	32	1	--	25	"	"
Lowell, Mass.	6	47 to 67	51	2&3	50 to 100	50	"	Irregular.
Plainfield, N.J.	6	35 to 40	20	2	20	50	"	Staggered in straight lines.
Memphis, Tenn.	6	260 to 480	10	1&2	50 to 200	50 to 200	Sand	Irregular.
West Superior, Wis.	6	45	77	1	--	Av. 16	Gravel	In straight lines.
Galveston, Tex.	7	750 to 850	27	1	--	300 to 500	Sand	" " "
Leipsic, Germany.	7	50 to 70	324	1	--	33, 38 & 60	Gravel	" " "
Brooklyn, N.Y.	8	148 to 154	4	1	--	50 to 600	Sand	Irregular.
Camden, N.J.	8	100	70	1	--	200	Gravel	Regular.
Memphis, Tenn.	8	260 to 480	31	1&2	50 to 200	50 to 200	Sand	Irregular.
West Superior, Wis.	8	45	4	1	--	Av. 19	Gravel	Straight line.
Galveston, Tex.	9	750 to 850	3	1	--	300 to 750	Sand	" "
Savannah, Ga.	12	Av. 500	12	1	--	300	Porous Lime Stone	" "

In general it may be considered that the coarser the grain of the water-bearing material, the larger may be the diameter of the pipe and the greater the area influenced by heavy drafts from each well; and hence also the farther apart should the wells be placed. It is therefore not advisable to select small tubes for wells in gravel and coarse sand, but in case fine sand is present a large number of small pipes is usually regarded as giving the best results for the same outlay. From the foregoing table it appears that a spacing of about one rod (16.5 feet) is customary for 2-inch tubes, but it is very probable that in the majority of cases a marked improvement would be gained by doubling this distance; and it is also seen that for tubes of from 4 to 6 inches diameter sunk in gravelly soils, a spacing of less than 50 feet may be considered injudicious. Similarly, when such large pipes are driven into sandy strata, a spacing of 100 feet may not be excessive, and is in fact often surpassed.

The effect upon the yield of a series of wells by placing the pipes too near each other, is clearly indicated by the following two citations taken from a short discussion of the subject in Vol. 31, Transactions of the American Society of Civil Engineers, 1894, p. 285. Mr. Wynkoop Kiersted there relates that in one instance where the water was contained in a bed of clean, coarse sand and fine gravel, he found seventeen wells from 3 to 6 inches in diameter and 45 feet deep grouped within a circle of 125 feet diameter; and that a pump test of the plant showed that seven of the wells yielded as much as the entire number; also that the natural water-table was depressed by the pumping to the extent of respectively 2 feet and 0.25 feet at distances of 95 feet and 400 feet from the wells of the maximum yield. Mr. H. V. Hinckley also mentions that an attempt was made to increase the water supply at Great Bend, Kan., by driving six additional 4-inch wells, 72 feet deep and spaced only 10 feet apart. On testing them one was found to give about 300,000 gallons per day, whereas not more than twice this quantity could be obtained from the entire group. Numerous other instances of similar experience might be added, but the foregoing are doubtless sufficient to illustrate the necessity of careful study of local conditions.

PROSPECTING FOR A SUPPLY.—A common method of prospecting for an underground water supply in a given locality is to sink three trial wells about 100 feet apart, placed at the corners of a triangle whose apex points in the presumed direction from which the subterranean flow proceeds, and whose base is therefore at right angles to this direction. During the process of sinking the pipes, the character of the different material encountered is noted as accurately as possible until a water-bearing stratum of sufficient magnitude is reached, whereupon the water is allowed to rise in the pipes to its natural level. Should this level be somewhat above the surface of the ground, the pipes can easily be carried up to the requisite height and be supported by proper bracing. In all cases ample time must be allowed for the water to come to rest in the tubes and the former conditions of equilibrium to be restored. From the relative elevations of the water surfaces in the pipes, the approximate direction of the underground flow is then deduced, and subsequently its normal velocity is determined by putting common salt or some other chemical in the upper well and observing the time which elapses before it appears in the two lower ones. The presence of the salt is easily established in pure water by well-known chemical processes, but if the ground-water contains an appreciable quantity of this substance, it may become more expedient to make use of a strong solution of lithia, or one of the intense aniline dyes. Samples for examination are taken from the bottoms of the two lower wells at frequent intervals by means of suitable appliances, so as not to change materially the water levels in the pipes.

With only three trial wells sunk as above described, there is, however, considerable doubt as to the accuracy of the velocity measurement unless two of the tubes happen to be in the line of flow, which is rarely the case. It is therefore safer to adopt the method followed by Mr. A. Thiem, of Leipsic, who, after determining the direction of flow as aforesaid, causes a fourth well to be sunk exactly in this direction at some distance from the first one, and then applies salt, etc., as before. From the velocity thus computed and the known character and extent of the water-bearing stratum, an estimate can now be made of the volume of the subterranean flow at the time of the test; and by making proper allowance for variation of this volume at dif-

ELISHA GREGORY,
Contractor for Drilling Artesian Wells,
60-64 Liberty St., New York.

ferent seasons, the availibility or adequacy of the proposed source is finally determined.

The next step is to ascertain the permanent minimum rate of inflow to one of the trial wells, as it often happens that a stage is reached when the natural supply is less than the contemplated draft. If the well is artesian, or flows copiously at a considerable height above the surface of the ground, the discharge can easily be measured at several different elevations; but if the water does not rise above the surface the matter becomes much more troublesome an expensive, as the available range is then reduced to the usual maximum suction lift of about 25 feet for ordinary pumping engines. The primary object of a pumping test is to find the most expedient position for the permanent machinery; and as deep-well pumps of small calibre are much less economical in operation than large suction pumps of the usual type, it becomes evident that the maximum depression of the ground-water surface, corresponding to the ultimate minimum rate of inflow, should be established as soon as possible. It is therefore advisable to pump the wells singly and jointly at the maximum contemplated rate of delivery for considerable periods of time without intermission, and obviously the most favorable opportunity for such a trial is afforded in the latter part of a long drought. If, however, the test cannot be postponed until the arrival of a dry season, the pumping should be continued as aforesaid for several weeks, or even months, before proceeding with the construction of the rest of the plant. In brief, a test which does not materially affect the underground storage capacity is of little value; and in view of the numerous failures of such water supplies, it is doubtful whether full confidence in the sufficiency of any proposed source can be gained in less than years of continued use.

For the pumping, a portable steam plant of ample capacity is generally provided, and the discharge is measured by means of a suitable weir or notch fromed at the end of a large plank trough or channel. Care must, however, be taken to secure as uniform a rate of operating the pump as possible, otherwise the depth of the flow over the weir must be noted at frequent intervals. A large water meter may also be used in place of the weir, but it should not be connected directly with the discharge pipe of the pump, as its accuracy of registration is sometimes seriously affected by the pulsations of the engine and the bubbles of air or gas which are often forced along with the water. In such a case, the best plan is to let the discharge of the pump flow into a slightly elevated tank or cistern, and apply the meter to an outlet pipe inserted a little above the bottom, so as to allow for the settlement of sand or grit. The meter should also work under some back-pressure, which can always be secured by raising the end of the outlet pipe a few feet. An obvious further precaution is to insure the delivery of the water into some convenient natural stream or channel from which it cannot return to the subsoil.

If the wells are of moderate depth in earthy formations, a series of 1.5 or 2-inch tubes should always be driven into the water-bearing stratum at different distances from the test well, in order to observe the rate at which the natural water-table falls while the pumping is in progress, and also the time required for it to regain its original level after the draft ceases. Such observations are easily made in straight vertical tubes, as light may be reflected down them with a hand mirror; or a small piece of sodium attached to a suitable sinker may be lowered down with a tape line and give a flash of light on coming in contact with the water; or a cylindrical wooden float, provided with a long cord or light wire and three small friction rollers at top and bottom, may be placed in each tube, and by attaching the cord to a counterweight running over an external scale board the position of the water surface will be indicated very closely; or lastly, the position may be determined with great accuracy by lowering into the well a very light and flexible brass pipe of only one-eighth inch bore, and then applying suction with the lips to a special mouth-piece at its end. This latter device was used with much success by Mr. J. C. Hoadley, C. E., in his experiments at Malden, Mass.,* as he states that the contact of the end of the pipe with the water surface was always sharply indicated by a peculiar fluttering or gurgling sound, and that the limit of error therewith was not more than 0.003 feet. It may also be added that if a float is used at each observation tube, the cord or wire may pass over two pulleys to the counterweight, so that the scale-board can be placed for convenience in a horizontal position a few feet above the surface of the ground, while an adjustable pointer can be clamped to the cord; moreover, the float should always be of considerable length and weight.

In the case of very deep wells, or such as penetrate far into rocky strata, the provision of numerous observation tubes is generally impracticable on account of the large attendant expense. Use must then be made of all existing wells in the locality, particularly those which reach the same water-bearing stratum, in order to determine how they are mutually affected by severe pumping. By this means a reasonable estimate may sometimes be made of the direction of flow and the available volume of the deep-seated water, but in general such conclusions are more or less unsatisfactory, owing to the difficulty of obtaining a correct knowledge of the various geological features. On the other hand, when only a single test well is available, it is obvious that no rational prediction as to its continued success is possible.

For a short time after beginning to pump a well, the delivery may increase by the opening of larger channels in the water-bearing material around the pipe or borehole; but if the pumping continues at correspondingly greater rates, a time will eventually come when the natural subterranean flow is exceeded. The storage volume in the subsoil will then be drawn upon, and the normal hydraulic gradient or water-table will fall, as previously pointed out, until the stage of permanent minimum yield is reached. In permeable deposits of large extent, the depression will assume the shape of an inverted cone with a wide base, and hence it is to be expected that considerable time will be required for the storage contained therein to become exhausted. The exact form and dimensions of the conical depression for different rates of pumping can be learned only from the aforesaid observation tubes around the test well; and if the plant is to consist of a series of such wells, it must be anticipated that these depressions will intersect to some extent, thereby reducing the available storage per well and either increasing their number or lowering the position of the permanent pumping machinery.

By thus obtaining a knowledge of the yield of a well or system of wells under different conditions of head, it becomes possible to design the plant intelligently, and hence the details described above should never be omitted where important interests are at stake. With respect to the spacing, it may be remarked that if the vigorous pumping of the trial well produces a greater depression of the water-table at the nearest observation tubes than is deemed desirable, an indication is afforded that the wells should be farther apart than such distances; and, by sinking an additional test well at an estimated larger distance from the first, and then pumping from both at the required rate, the observation tubes will soon show the extent of mutual interference. Should the resulting depression still be greater than is wanted, the spacing must obviously be increased; and by proceeding in this manner the proper distance will be found from a few more trials. The fixing of the ultimate depression of the water-table also implies a definite location of the pumping plant, for the reasons already mentioned; and hence where this level is found many many feet below the surface, the pumps must be placed at the bottom of deep shafts, as at Memphis, Tenn., and Riverside, Ill., while in other cases a location at or near the surface may be amply sufficient.

It should also be stated that in the process of sinking the trial wells and observation tubes, proper care must be exercised to maintain a tight seal at every impervious stratum that may be pierced, as otherwise it may happen that a portion of the water from a deep bed will escape into an absorptive overlying one by flowing rapidly upward through the annular space around the pipe, and thus affect the level of the water on the inside; conversely, the leakage of undesirable water by the same path from a higher into a lower stratum which has a smaller natural head, will likewise vitiate the results of the test and lead to wrong inferences concerning both quantity and quality. Similar deceptive results may also be obtained when a strong flow of bad water, or a dry and permeable stratum, is found by continuing the well to a greater depth. In such cases the well must be securely plugged or abandoned. The character of the material must therefore be watched very closely as the work advances, and the sinking process adapted to it in order to avoid the troubles to which attention has been called.

Instances of the loss of water by flowing around or through a well from one stratum into another are by no means rare. Thus on the completion of an artesian well 1,600 feet deep at Wilwaukee, Wis., in 1883, a flow of 720,000 gallons per day was obtained from the lowest strata after the insertion of a casing to shut off the Niagara limestone at a depth of about 400 feet. Before this was done the yield of the well was only two-fifths of the said quantity.* A similar case occurred at Tours, France, in 1887. Two wells of the same size and at the same surface elevation, were sunk to a depth of 558 feet through four identical water-bearing strata separated by various intermediate layers. The first well was cased down to the fourth statum and yielded 1,520,600 gallons per day, while the second was uncased for its entire depth in the rock and yielded only 320,200 gallons per day.† There are also many instances of wells where the inflow of water from higher strata was entirely lost after deepening, and advantage was taken of this peculiarity in a certain district of France to drain extensive areas of swampy land into highly absorptive strata far below the surface. It is therefore evident that in prospecting for water the discharge of each permeable stratum should be carefully gauged as the sinking progresses.

Reference to the necessity of thoroughly studying the geological and topographical characteristics of the locality has already been made, and it need only be added that the quality of the water found in each of the saturated strata penetrated by the trial wells should also be carefully examined. Such strata often pass under many populous districts, and may either be tapped subsequently for other water supplies or become polluted with dangerous organic wastes from cess-pools, factories, etc. Furthermore, the investigations should include a search for irregularities in earthy deposits, faults in rocky formations, and other geological accidents, all of which may lead to erroneous conclusions about the extent and adequacy of the underground source. All this preliminary work is obviously tedious and more or less expensive, but without its thorough performance no assurance of success can reasonably be given.

METHODS OF SINKING.—The pipes for driven wells are generally made of wrought-iron or steel, and are either bare or provided with a protective coating of zinc or bituminous material like asphalt, coal-tar pitch, etc. For public water supplies their diameter ranges from 2 to 12 inches, as previously mentioned; and when being driven they usually have at the bottom a perforated section of more or less length, terminating in either a conical point or a cylindrical cutting edge. This lower section of the tube is called the "well-point" or "strainer," and the perforations may consist of either small round holes or narrow slits to admit the water while excluding ordinary sand. To prevent the closing of the holes by rust, the strainer is commonly made of brass, and as an additional protection against the entrance of sand or grit, it is covered or lined with finely woven brass wire-cloth. The use of such cloth is generally very advantageous, but occasionally both the meshes and the perforations become quickly clogged. They must then be cleared either by forcing air, steam or water under suitably high pressure down the tube and out through the holes into the adjacent subsoil, or by pulling up the entire tube and removing the obstructions mechanically with brushes, etc. The external diameter of the strainer is usually the same as that of the pipe, although in some cases it is considerably larger. Its length must be sufficient to make the aggregate area of the exposed meshes or perforations several times greater than the cross-sectional area of the pipe, and to allow for possible future obstruction it is customary to adopt a ratio for said areas of at least ten to one. For pipes pipes of relatively large diameter the strainer consists of a number of sections screwed together to give the required length.

The methods of driving or sinking the pipes vary greatly, and depend on their size and depth, as well as the character of the material to be penetrated. In earthy soils, small tubes are driven with sledge hammers, or with a light portable pile-driver, or with a weight having a central perforation through which the pipe passes, and which falls upon an adjustable iron ring tightly clamped to the pipe, the weight being raised by hand or horse power with a rope passing over a pulley fastened either temporarily to the upper part of the pipe itself, or to a light frame or tripod erected over the site. For larger pipes in the same class of soils, a more elaborate pile-driver with a heavy wooden ram lifted by horse or steam power is often used; and for still larger pipes, a high timber derrick is erected and provided with steam power for hoisting the heavy driving weight and handling the heavy sections of tubing and tools. In all cases a special driving cap is applied to the upper end of the pipe on which the hammer or weight falls; and during the operation care is taken to keep all joints of the pipe tightly screwed up by efforts to turn

*"Engineering Record," Vol. 11, pp. 11-86, 1884-5.

*"Engineering News," Aug. 3, 1889.
†"Engineering News," June 16, 1888.

it in the ground, as the jar produced by the falling weight tends to loosen them. The turning of the pipe is also said to facilitate its descent by releasing the temporary grips of stones, etc., in the subsoil.

When the lower end of the tube is closed by a conical point, no solid material can gain access to the interior and the subsoil must necessarily be displaced and compressed laterally to make room for the pipe. This compression is often regarded as being prejudicial to the yielding capacity of the well, and hence many expert well-drivers prefer to leave the lower end of the strainer open and equip it with a hard steel shoe or cutting ring of somewhat larger external diameter to prevent damaging the comparatively soft brass. Other experts prefer to sink an open-ended pipe of a little larger diameter than the strainer to the required depth, after which the strainer is inserted and the pipe pulled up a corresponding distance. The driving is done as above indicated, whereby some of the subsoil is forced into the pipe and must be removed from time to time by means of special augers and scooping tools or a sand-pump. If practicable, the material at the bottom is thus excavated for a few feet in advance of the pipe, whereupon the latter is readily driven into the cavity with little disturbance of the adjacent ground. By the use of the augers and scoops an excellent knowledge of the character of the subsoil is gained, but with the sand-pump it is much less definite, as will be evident from the following description of this useful instrument and its mode of operation.

Several styles of sand-pump are made which are adapted to different materials, depths of working and sizes of pipe. In one form the device consists of a section of light tubing, from 4 to 6 feet long, provided at the lower end with one or two flap-valves opening upward, and at the top with a wooden rod as a handle for imparting a churning motion. The diameter of the piece of tubing is here nearly as large as the inside of the pipe or casing. In another form the pump consists of a light iron pipe, one inch or more in diameter, having at the bottom a short conical enlargement with a solid flat end, across the middle of which a strong chisel-shaped cutter, two or three inches long, is securely welded. A small hole is bored vertically through the flat base close to one or both sides of the cutter, and is fitted with a flap-valve opening upward into the conical cavity communicating with the said pipe. When the instrument is to be used, a quantity of water is first poured into the well-tube to soften the earthy material at the bottom, whereupon the pump is lowered into place, successive lengths of rod or pipe being added until the bottom is reached. It is then moved rapidly up and down, as in churning, the water and cutting edge converting the soil into a thin mud which is forced upward by inpact through the valves into the tubular receptacle or pipe above, and the fluidity of the material being regulated by the amount of water used. After a time the space above the valves becomes filled with the soft material, whereupon the pump is withdrawn and emptied and the operation repeated as may be desired.

If the ram of the driving apparatus has a central perforation to receive the small pipe of a sand-pump of the second style, an elbow may be attached to the upper end of the latter; and by using an excess of water in wells of moderate depth the liquid mud can be ejected laterally therefrom by forcible churning, so that the work may be continued without removing the pipe from the well-tube. Accumulations of small pebbles at the bottom are easily collected in pumps of the first style, and larger stones are retained in slightly tapering open-ended tubes. Cobblestones and small boulders must obviously either be crowded aside or be broken into suitable fragments with a heavy drilling tool, and if this cannot be done the casing is pulled up and sunk in a new location.

The most expeditious manner of sinking tubes through earthy strata, however, is by the water-jet process. Here a pipe whose diameter is from one-third to one-half the diameter of the well-casing is placed inside the latter, after a depth of a few feet has been attained by driving, and water is forced through it by a powerful pump. The lower end of the inner pipe reaches to the bottom and may either be wide open or contracted into the form of a nozzle, or fitted with a cutting chisel and small holes like the aforesaid second style of sand-pump. The issuing water impinges more or less violently against the soil and loosens it to such extent that the rapid upward flow in the annular space between the inner pipe and the casing carries all the finer earthy particles to the top in suspension. The remaining coarse sand, pebbles and stones must be removed from time to time by taking out the jet pipe and using the sand-pump and other tools, as above described.

In hard material, progress is greatly facilitated by using the cutting chisel with a number of small jets, and imparting a churning motion to the inner pipe. While the pump is in active operation, the casing either sinks by its own weight or is driven down by a heavy hammer. In fine sandy or loamy ground, the jet-pipe generally descends faster than the casing, and to avoid the formation of undesirable cavities in the subsoil it is often expedient to keep the latter driven somewhat in advance of the former.

A tube of moderate size can also be sunk rapidly in earthy deposits by coupling a large hose from the pump directly to the top of the pipe, and forcing the water out under its edge, or through one or more orifices in its bottom, thus causing an upward flow to the surface along the outside of the pipe. The loosening of the material at the bottom and sides by the escaping water usually induces the tube to descend without much driving, and the operation is stopped only long enough to allow the successive lengths of pipe to be screwed together, or obstacles to be removed in the case of open-ended tubes. This method is, however, objectionable where the ground-water above an impervious stratum is bad, as the seal around the pipe in such stratum is liable to serious damage by the external upward flow of the water used in sinking. An injury of this kind is irreparable and may have various disagreeable results, such as the impairment of the quality of the deep-seated water, the reduction of the yield of the wells by permitting the continual escape of the confined lower water into polluted upper strata, the undesirable raising of the original water-table in the latter, etc.

By either of the above-mentioned hydraulic processes, tubular wells are sunk with great rapidity, a few hours sufficing to attain considerable depth in ordinary soils. The erection of the necessary plant, however, involves much time and labor, as provision must be made either for an abundant supply of clean water, or for allowing the sediment which is carried in suspension by the ascending currents to settle, in order that a part of the water may be used over again. In the latter case a number of portable wooden tanks, or a series of water-tight shallow basins excavated in the natural surface of the ground, are required, thus adding materially to the cost. It should also be remarked that while the sinking is in progress, the casing should be frequently turned or rotated to preserve the tightness of the screw-joints and loosen the adhesion of the surrounding subsoil, as already indicated. These hydraulic processes, moreover, possess the advantage of not subjecting the strainers to much injury when they are sunk in connection with the casing, as the escape of water through the perforations can easily be stopped by inserting a temporary tight lining which can be removed after the proper depth has been reached.

Of the relative merits of the different methods of well-sinking in earthy strata with special reference to the subsequent yield, little can be said, as this feature is largely dependent on the character of the material penetrated, and reliable comparative data are rarely found. In deep beds of clean sand or gravel, and in places where no attention need be given to maintaining a tight seal at impervious layers, the wells may obviously be sunk by the cheapest process; but in cases where such a seal must be kept, the first-named jetting method with an inner pipe is certainly preferable to the second. In putting down the three driven-well plants at Lowell, Mass., nearly all the processes referred to above were adopted at different times and localities, and in the report of City Engineer George Bowers, it is stated that the 2-inch pipes which were driven with sand-pumps did not give as good results as those which were sunk by the second hydraulic process.

In drilling wells through rocky strata, the work is necessarily much slower and more expensive than in earth. A strong frame or derrick for supporting and conveniently handling a variety of heavy tools is required, and a steam engine and boiler usually furnishes the power. By repeatedly lifting and dropping in the same vertical line a thick iron bar fitted at its lower end with a hard steel cutting edge shaped like a chisel, the rock is gradually pulverized or reduced to small fragments, and by continually giving the tool a rotary motion an approximately cylindrical hole is formed. The comminuted material is removed from time to time with a sand-pump and water, and to insure perfect freedom of motion for the further progress of the drill, the hole is also made truly round and vertical with another tool called a reamer. To facilitate manipulation, the drill bar is made in sections of moderate length which are screwed together, and to the uppermost one a pair of long and heavy iron links, called a "jar," is usually attached whereby a sudden upward jerk or blow can be imparted to the bar in case the tapering bit or cutting edge becomes wedged in the hole. The series of drills, bars and attachments of different kinds is called a "string of tools," and varies in length from 6 to 60 feet, according to the size and depth of the hole and the hardness of the rock, while its weight is from 400 to 4,000 lbs. By means of a strong rope or cable passing over a pulley at the top of the derrick to a suitable lifting and releasing mechanism operated by the steam engine, the heavy string of tools is alternately raised and dropped from 2 to 4 feet, thirty or more times per minute, a depth of several feet of water being kept in the hole to promote the work.

The rate of progress in rocky strata obviously varies greatly with the nature of the material and the size and depth of the hole. In a paper on the subject in the Journal of the Franklin Institute for September, 1893, Prof. Carter states that the most difficult rocks to drill are trap, quartzite, compact fine-grained sandstones, certain clay slates, granites, syenites, compact hornblende schists, obsidian, etc.; also that in the Potsdam sandstone of Pennsylvania, the rate of drilling with a 6-inch tool is from 1.0 to 2.5 feet per hour, while in certain clay slates a progress of barely 0.5 foot per hour can be made. Other authorities report that in ordinary hard sandstones and limestones, a penetration of from 1.0 to 1.5 feet per hour can be regarded as a good performance with a first-class drilling equipment and 6-inch to 8-inch holes of moderate depth, whereas in granite and trap-rock only about one-half of this rate should be expected. It must also be remembered that much time is lost in taking out and replacing the tools when the hole is more than a few hundred feet deep, and that the danger of breaking tools and rope is aggravated as the depth increases; hence in very deep borings the average rate of progress is necessarily small. Thus a period of two and one-half years was required to make an 8-inch boring 3,700 feet deep at Northampton, Mass., 150 feet of the depth being in earth and the remainder in hard sandstone;* and if we assume the working time to have been 760 days, the average rate through the rock becomes in this case about 4.7 feet per day. Similarly, nearly four years' time was recently spent in making a test boring for minerals, 5,735 ft. deep, at Schladebach, Germany, the average rate for a hole ranging in diameter from 11 inches at the top to 1.3 inches at the bottom, having been 4.59 feet per day.

(Continued in July number.)

*"Engineering Record," Vol. 16, p. 620, 1887.

A Town Transformed by Women.

Dissatisfied with the progress of the town under masculine rule, the women of Healdsburg, Cal., says an exchange, gently but firmly took possession of the reins and are now driving the municipal coach their own way. Their organization is called the Ladies' Improvement Club of Healdsburg, and it was formed in August of last year. Since that time—in the short space of nine months—this is what the club has accomplished:

A municipal water system.

A municipal electric light plant.

Comfortable seats placed in the plaza.

Names given to the streets.

Sign boards with street names placed at street corners.

A drinking fountain for the plaza costing $600.

All these improvements had been discussed for years by the men. It remained for the women to make them realities. And, with the exception of the electric light plant and the water system, the city taxes have not been increased by as much as a farthing to pay for these things.

The local telephone company of Fargo, N. D., contemplates putting its wires underground in the business portion of the city.

Streets and Lighting.

Chicago's Rotten Pavements.

A total of 1,209,398 square yards—79.28 miles—of paving has been contracted for, to be laid in Chicago's streets and alleys this year. The cost of these miles of improvements, aggregating $2,118,463 for the paving alone, must be paid by the property owners on the streets under special assessment levies. Last year 824,047 square yards, or 49.24 miles, of street and alley paving was laid at a total cost for paving alone of $1,472,000.

During 1899 bad material was used on many streets. Contractors dodged requirements of the specifications with impunity and material was improperly placed in many instances. City inspectors were found guilty and discharged.

As a result of these methods many pavements recently laid already are going to rack. Experts estimate that these irregularities cost the property owners concerned a net loss of $250,000. For every dollar lost on bad paving then, they contend that an eventual loss of $5 will ensue through needs which will arise some years hence. The total eventual loss, therefore, is placed at $1,250,000, nearly equal to the first cost.

Wood vs. Asphalt Paving.

D. J. Ross, city engineer, has presented an interesting report to the Court of Common Council on the comparative durabilities of wood and asphalt carriageway pavements. He states that ordinary deal blocks have been in use for paving purposes since 1871, and this class of pavement in streets where the traffic is considerable has to be relaid at intervals of from five to seven years. The Australian hard wood has not been used in the city for any length of time, but judging from observations he has made outside the city, this class of pavement does not appear to be of that durable nature which was anticipated. In some parts of the West End the hard wood paving has been removed and deal blocks substituted for it. With regard to asphalt it has been in use in the city for paving purposes since 1869, when a portion of Threadneedle street was laid with it experimentally. In nearly all the main streets of the city compressed asphalt is used, and in some of the minor streets where the traffic is small the pavements have been down for thirty years. On the Holborn viaduct the pavement has been down for seventeen years, in Londonwall for twenty years, and in Lothbury for twenty-three years. In the Poultry the pavement was in use nineteen years before it was relaid, and in Prince's street the asphalt lasted twenty-two years before it was renewed. The engineer reports in favor of the use of asphalt rather than wood in a thoroughfare like the Holborn viaduct, where the carriageway traffic represents about 12,000 vehicles in twelve hours. The lowest tender for asphalting that thoroughfare was £5,980 13s. 6d., and a hard wood pavement would cost £6,000.—"The Surveyor," London.

Testing Portland Cement at Berlin.

Details of the mode, manipulation and methods employed for testing Portland cement at the testing station at Berlin are given in the latest copy received of the Mitt. Konigl tech. Versachanet zu Berlin, and are as follows:

Seeing that the time of setting of cement is largely influenced by the percentage of water needed to gauge it, it is important to determine the precise quantity strictly required for each sample. This end is attained by making a preliminary experiment on the quantity of water necessary to bring a weight of 300 grms. of cement into a syrup consistency, so that it flows freely from a palette knife. Between 32 and 38 per cent. is usually requisite. Calling this quantity N, the percentage of water needed for slow-setting cements can be calculated according to the following empirical formula:

$$\text{Neat tests, per cent of water} = \frac{N+1}{2}$$

$$1+3 \text{ cement, per cent of water} = \frac{N+3}{4}$$

Quick-setting cements:

$$\text{Neat tests, per cent of water} = \frac{N+2}{2}$$

$$1+3 \text{ cement, per cent of water} = N+6$$

The formulae are found to apply with fair accuracy to normal Portland cements. They lead to a result of such a character that the neat tests are generally gauged with from 16 to 19 per cent. of water. In determining the setting time when the cement has been gauged with the quantity arrived at by the circuitous process described in the foregoing, the Vicat apparatus is used. Owing to the fact that a loose scum commonly accumulates on the surface of the test block, it is the practice at Berlin, when once initial setting has occurred, to reverse the block, and take the true setting time on the bottom surface. It is also customary not only to take the temperature of the air at the time of setting, but also to observe its percentage of moisture by means of a hair hygrometer.

Great difficulty is expressed in the actual determination of fineness, on account of the imperfection of most commercial sieves. Thus it is described in the standard rules for cement testing, approved by the Association of German Cement Makers, that the 900-mesh sieve shall be made of wire 0.111 mm. in diameter, and have a mesh opening of 0.222 mm.; the sieve actually in use at the testing station is made of wire 0.094 mm. in diameter and 0.230 mm. clear in the mesh.

One of the difficulties of obtaining reliable standard sand arises from the same cause as that mentioned under the previous head, namely, the irregularity of the sieves commercially procurable. That this is sensible is apparent from the following figures:

	No. of Meshes. 120 mesh sieve.	Width of Mesh mm.	Diameter of Wire. mm.
Prescribed figures	60	0·87	0·38
1	129	0·60	0·30
2	121	0·654	0·255
Prescribed figures	120	0·589	0·32
	60 mesh sieve.		
1	525	0·88	0·458

The considerable effect of the errors of construction may be realized when it is stated that with the sieves quoted above, No. 1 allowed 4.6 per cent. of standard sand to pass through it, and No. 2 as much as 35.4 per cent. The errors may be greatly enhanced by wear, the wires becoming more or less displaced. Similarly the irregular stretching of a piece of wire gauze on a round frame to form a sieve will impair the accuracy of the width of the meshes, and square-framed sieves are generally preferable. Photographs of the actual sieves are given on an enlarged scale, demonstrating the exceeding irregularity of the best commercial sieves in width of mesh. —"Clay Record," Indianapolis.

Gas vs. Electricity for Lighting Purposes.

By J. R. Cullinane.

I assume the above subject was assigned to me for some good reason, but I wish to assure you that I have had no experience in selling either gas or electricity in competition; on the contrary, nearly my whole experience has been in selling both articles at the same time to the same class of patrons. I will endeavor to tell you something about selling gas and electricity from this standpoint.

It is a hard matter to adjust the prices of both articles on an equal basis, especially is this so in a small city where there is a demand for flat rates. Flat rates are a nuisance where the company using them is also selling gas and electricity through a meter service. I will add flat rates are very unsatisfactory. In early days I asked a promoter of electrical plants (who in those days usually represented some large manufacturer) why he asserted a six candle power incandescent lamp sold at a certain price was all we could get for it, he replied that we must meet the prices at which we were then selling gas, and he added that the demand for electricity had to be met irrespective of its cost. Indeed, he was uncertain as to its cost. Of course we all know more now as to its cost than we did then, but I have often observed that a great many of the plants in Texas established their prices in the same way, and probably for the same reason. The fair and equitable way to sell electricity is through meters. In the gas business the meter is used exclusively; the manager of a gas company can tell you his leakage, his yield and exactly what it costs him per thousand cubic feet to make or deliver his gas; hence he can deliver his product on a basis through meters so that every foot of gas sold brings in pro rata profit.

In the electrical business we should do the same thing. We should know our leakage and what it costs to generate and deliver the current per thousand watts. To do this we should measure the current as we send it out through large station meters, and then sell it exclusively through meters to our customers. All flat rates should be avoided. The investment in meters will be large, but I think the ability of the plants to sell to a large number of customers, and thus save additional machinery, will fully repay for the investment in meters. The early prices of electricity were established to compete with the then existing prices of gas. Gas at $2 per thousand cubic feet was figured out equal to current at 20 cents per thousand watts, or one cent per ampere hour, and the flat rates were adjusted accordingly.

Assuming the prices of gas and electricity adjusted on an equitable basis, we will pass to the next problem, that of handling the "dear public." If we find any of our patrons with any ideas as to the kind of light they desire to use we encourage them in their choice. We always endeavor to let them say what kind of light they shall use without any influence from ourselves.

Necessarily, the dual interests of a company selling gas and electricity for lighting purposes clash; but we find many places in our line of customers where only gas will serve the purpose, and other places where only electricity will answer. We always take advantage of these opportunities to keep the interests from encroaching each other and at the same time increase the growth of each business.

In the lighting business exclusively each kind of light has its particularly good points. In the management of a company selling gas and electricity we find other territories besides the lighting business in which to sell our products, and in these we find the dual interests do not clash.

Our sales of gas for cooking purposes in no way affect or decrease our sales of elec-

*A paper read at the annual meeting of the Southwestern Gas, Electric and Street Railway Association, Waco, Texas.

tricity: to a dual company this is a wide field: 40 per cent. of our gas is sold to this class of business, and the percentage is always growing. I can remember only a few years back when gas companies had only a small part of their output going through gas stoves. We have another large field for the sale of gas through the medium of the instantaneous water heater. This apparatus has reached a very high state of mechanical perfection, and the demand for them is growing. They are very satisfactory to the patrons of a gas company, and as they are very liberal in the consumption of gas, are also very satisfactory to the gas companies themselves.

By pushing the sale of gas in these two fields we do nothing to hurt our electrical business. The advent of the Welsbach burner brought joy to the gas man, but the Walsbach burner is in direct competition with electricity, and it is not my purpose here to discuss that side of the question.

As I stated above, I will endeavor to show you there are spots in the dual business that are not necessarily competitive.

I have stated a few of the fields in the gas business that can be pushed without hurting the electrical business. On the other hand, in the field of electricity we have a class of business that can be pushed that will not hurt the sales of gas. I have reference to the sale of current for use in small motors and fans. This is a very wide field and a very profitable one. The prices usually paid for power current are more remunerative than those paid for lighting purposes.

Nearly any electrical company can operate a power circuit successfully and profitably. The number of places that will use motors and fans is astonishing. To a company doing a dual business this class of business is of great assistance. Another field for selling current is in the way of advertising. You find many customers who spend money for electricity in different ways to advertise their business. Some will use arc lights and incandescent lights illuminating the outside of their stores and show windows; others working electrical devices and signs to attract attention to their stores. This is not in competition with the sale of gas, but brings in quite nice returns.

Further, by combining the business, if you can control the territory and avoid the awful prices usual where competitive plants exist, there is a hope for success. I am frank to say I often wonder how some of the competitive plants exist and sell their products at their prices. I think good management should mean good prices, and I don't understand how some of these competing plants can pay their actual operating expenses, to say nothing of fixed charges, interest, depreciation and repairs. I assume they know their business and are pleased with the results. Anyway there is one set of people happy where there is competition in the lighting business; that is, my friends, the "dear public."—"Electricity," N. Y.

The city of Elmira, N. Y., has recently awarded a contract for three years to the Elmira Illuminating Co. for lighting the resident streets with incandescent lamps of 60-candle power, substituting them for the naphtha lamp at present in use, of which there are about 450. The lamps are to cost .0798 cents per lamp per night on the moonlight schedule. A few lamps are required to burn all night, the price being .0822 cents per lamp. This will be an improvement on the present system, but will increase the cost of lighting the streets by about thirty-five hundred dollars. In addition to these lamps the city has over 300 arc lights.

Street Railways in South Africa.

The street railways of Cape Town have a track mileage of 25 miles; the employees number 300 men, and 15 single-deck motor cars, 32 double-deck, and 8 trailer cars are in use. The lines run to the suburbs and are to be extended to the docks. The cars are all made in America; the single-deckers have large platforms in front and rear, with roomy seats for the accommodation of smokers. "Trailers" (open cars), with seats running crosswise, are attached to the double-deckers morning and evening to accommodate the increased traffic. All the cars, except the trailers, have a middle aisle, with seats on each side holding two persons. The upholstering of the seats is in cane and is always neat, and the color of the cars (yellow) is kept bright and fresh. As the English people are kind to the blacks, no distinction is made on the cars. New cars have been lately ordered from the United States to serve the increasing population caused by the exodus of the refugees from the Transvaal and the large numbers of soldiers in the city, who, at half price, are good patrons when off duty or riding to and from the various camps. As most of the merchants, clerks, and government officials live out of the city proper, the tram lines are well patronized. No passes or free tickets are furnished.

Outside of the Philippines, I can not hear of a city that has a larger proportion of Malays than this one. They are a pleasure-loving people, and Saturdays and Sundays are devoted to pleasure, principally picnics and fishing. They are good patrons of the tram lines.

The charges are high, 6 cents being the regular rate for a distance of from 2 to 3 miles. Eight miles, the extent of the longest line, costs 36 cents.

The Cape Electric Tramway Company, Limited, has just declared a dividend of 6 1-2 per cent., as against 5 1-2 per cent. for 1898.

The lines in Cape Town and Port Elizabeth are owned by an English company. They were built by American mechanics, are now managed by Americans, and are a source of revenue to American manufacturers, as supplies come from the United States. There are no better built lines in the world, but I regret to say that the very superior posts (iron) for the conveyance of the wires came from England.

The Port Elizabeth system consists of 11 miles of track, the employees number 100, and there are in use 12 single-deck, 6 double-deck, and 2 trailer cars. Permission has been granted by the Cape government to a company (Mill's Syndicate) to construct a line of electric road from Cape Town to Kamp's Bay. It will pass along the sea road, a fine drive. Orders for material, etc., will begin to be placed about March.

In Kimberley one-horse cars still run, and the distance covered by the line is about 8 miles. After the war, the power will undoubtedly be changed to electricity.

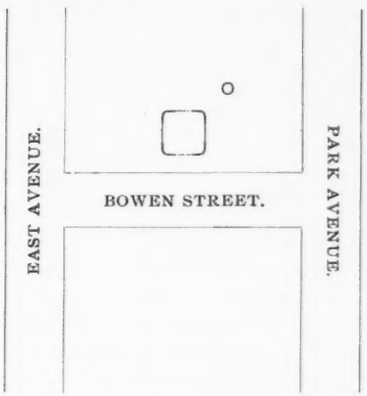
At Johannesburg, the same style of cars is used as at Kimberley, the government having refused to grant concessions for the building of the electric line, for the reason "that the farmers would lose the sale of forage (oat straw)." Even the bicycle is objected to for the same reason, and a heavy tax is placed on it.

In East London, there have recently been constructed about 5 miles of electric tram lines. Only 3 cars are in use at present; but the number will be increased. The line was constructed by Johannesburg parties, the motor cars and plant by English and American builders.

Sewers and Garbage.

Novel Garbage Complaint.

Attorney John C. Toole of Rochester, N. Y., has filed a most amusing garbage complaint at the office of Commissioner Grant. The complaint contains a diagram as below:



Under this diagram appears the following: "The circle indicates the position of a can of garbage that has been untouched by the collectors paid for that duty for more than three weeks. One complaint has been made, no response. This is the last call. J. C. TOOLE."

Sewage Purification.

A recent consular report from Paris details the operation of the Paris system of sewage disposal for the purification of the Seine. The system is practically the same as that employed at Berlin, the sewer water being pumped upon outlying farms, from which the purified water is allowed to return to the river. The first experiment was made more than thirty years ago and proved entirely satisfactory. The latest addition was in 1895. The total of land available is 12,350 acres, not all of which is utilized. A part of this land has been purchased by the municipality—about 4,000 acres—the remainder being offered free for the city's use by the private owners. The cost of the plant, begun thirty years ago, was $1,158,000, and the cost of all equipments, including canals, has been $7,334,000. Figured on the Parisian basis, Chicago might have disposed of its sewer water at a plant cost of not more than $5,000,000 or $6,000,000, with the result of actually eliminating the noxious elements and increasing the fertility of a considerable area about the city. On the same basis Pittsburg ought to be able to dispose of its sewer water at a cost of $2,000,000 or $3,000,000 at the most. European cities have been driven to these means of sanitation by bitter experience. American cities have profited in other matters by European experience, and they may in this. They have profited to an extent that, together with the advance in general medical and sanitary science, has raised the average of human life in this country from a little more than thirty years to forty years. But in the particular of polluting the streams the United States have shown so little disposition to improve that it may be doubted whether it will reform without a costly lesson of experience.

City Sewage Farm.

The members of the sewer commission of Columbus, O., are somewhat puzzled as to what they are to do in relation to a sewage disposal plant. In the law which created the Board of Commissioners it says they shall devise some means for disposing of the sewage through a plant system, but does not authorize the board to raise funds in any manner to do this.

It is thought, however, tnat the work can be done under the provisions of a law passed on March 30, 1892, which authorizes the issue by the city of a $100,000 bond for the purchase of a sewer farm. Of this issue, but $25,000 have been put out by the city, and this amount was used for the purchase of the English farm, which the city now owns. It has been decided by the sewer commission that this farm will not do for the work, as it is too near the city, and the chances are that the commission will take advantage of the law last referred to and will recommend that the remaining $75,000 be devoted to the purchase of a sewage farm.

Collection of Garbage in Small Cities.

City Clerk Lamborn of Alameda, Cal., has been wrestling with the garbage problem as related to his city. There are many readers of "City Government" who are deeply interested in the subject who will be glad to consider his plan. It is as follows:

Three thousand five hundred dwellings pay 25 cents per month, per year, $10,500.

Cost of Collection:

18 men at $45 per month	$7,320
9 teams at $20 per month	1,920
Disinfectant	500
500 Sanitary cans	500
Total	$10,240

Leaving a balance of $260 for incidentals.

This is allowing for removal twice each week, or rather one removal in five days, a service that a charge of 50 cents a month, or $6 per year, is now made for.

If the garbage removal were amalgamated with the gutter cleaning gang of the street department, the cost of the two services would be materially reduced and consequent bettering of the service would result as follows:

Cost of collection by the city	$10,240
Cost of gutter brushes after the first round the hoe would not be necessary...	
4 men at $45	$2,160
Total	$12,400

This would be a financial saving of at least $3,000 to the taxpayers of the city of Alameda and an incalculable benefit to the residents of our city.

The one item alone of the disinfecting of the receptacles will materially assist in keeping down disease and away contagion. The service of every five days will second the disinfecting and things will be pure and sweet. This city will be first on the coast to adopt the measure and will thus keep in the van of progress.

At our present assessed valuation it would take 9 cents on each one hundred dollars to raise the amount necessary to remove the garbage. This on the averaged $2,000 assessment would mean $1.80 per year for doing the work that we are now being compelled to pay from $5 to $9 for.

It would be a saving of what would equal 12 cents of our tax levy to the people of our city who pay the taxes, besides making Alameda much cleaner and increasing the sanitary system to a point second to none in the world.

Then there would not be the trouble and time wasted in paying the ashman, and if there was a complaint there would be a place to make it without fear of abuse or indifference.

In making these figures I have used the very lowest figure in making up receipts and the highest in the expenditures. After the first year I think that the net saving to the city would be $8,000 per year or equal to about 8 cents in the tax levy.

Purification of Sewage.

In a paper read before the Pennsylvania Municipal League, which recently met at York, Pa., Mayor Giles described the sewage disposal plant now used in his city—Altoona, Pa. He said in part:

We believe we have the sewer disposal problem for our city solved. Altoona is situated at the foot of the Allegheny mountains, we have no rivers or large streams passing through or near our city, only a shallow creek about ten feet wide. For years our sewage has been flowing into this creek, and the city has been sued by almost every farmer along its course, and damages were awarded from time to time. Holidaysburg took up the matter and we were compelled to dispose of our sewage in some other manner or pay heavy damages. We then decided to build filtration beds.

Our system is the intermittent filtration system—we have the largest plant in the United States, and the only plant in this state except a small one at Wayne, Pa. Our plant is successful in disposing of the sewage of Altoona. It has been in operation almost four years and, I believe, this system of filtration could be used successfully in all our third-class cities and towns, which would purify the water of our rivers and streams, and bring them back to a state of almost primitive purity. What are intermittent filtration beds and how do they dispose of sewage and purify it? These beds are constructed in a highly scientific manner and it is interesting to know that through this system of filtration, the black, filthy sewage that flows from these beds disappears from view with all its vileness and filth with millions of disease germs and reappears again at the west end of the beds flowing out of an eighteen-inch pipe, transformed into water as clear and sparkling as a mountain stream. I have seen persons drink this sewer water and taste it, and say that it was free from any taint and it is claimed that this water is pure enough to be used for domestic purposes. The city engineer called my attention to the fact that the men working on the filter beds in August of last year, used this water for drinking purposes in preference to well water situated on the city farm.

The plant is situated four miles from Altoona and was constructed at a cost of ninety thousand dollars. It comprises sixty-seven acres of sandy, stony land. The land was graded and leveled and around the sixty-seven acres was erected a three-foot embankment, which is sodded and presents a neat appearance. These sixty-seven acres were then sub-divided into forty separate filter beds, by three-foot embankments. From four to six feet beneath the surface of these beds is a series of small tile drains all leading into a large single iron pipe, sixteen inches in diameter, through which the sewage flows off the beds into the creek clear as a crystal.

The sewage passes through a screen tank before it enters the beds and all solid matter, tin cans, paper and such material, is not allowed to pass on the beds. By the time the sewage is carried three and one-half miles through the pipes to the filter beds, all the solids are broken up. A line of pipe is laid around the beds and lead into each bed through a gate chamber which can be opened or closed at will of the attendant.

To illustrate, we will now turn sewage on bed No. 1 until the bed is covered over to a depth of about three inches. This requires two or three days' time, then the valve is closed and no more sewage is allowed to pass on the bed for two weeks. During this time the sewage sinks into the sand a depth of two or more feet and a jelly is formed and the bacteria—minute living organisms—adhere to the sand and begin their work of eating up and destroying all the live matter and nothing is left but the clear water to filter out through the under-ground tile into eighteen-inch pipes which empties into the creek.

It is not the sewage filtering through sand that does the purifying or destroying of organic matter; it only rests the sewage in the sand, while the bacteria do the work of eating up the organic matter. If the beds were hard clay the water could not percolate through the soil and would decompose on the surface and create offensive odor. If you were to take a barrel of sand and pour water into it, the water would come out of the bottom of the barrel clear but not purified from sewage filth. If you were to let the water stand in the sun a stench would arise from it, but, if a school of bacteria was started in the barrel, you would find the water that you would filter through the barrel would then be clear and free from organic matter. Our record of August shows by a mistake the operator turned on the sewage into one of the beds twice within a week, we found that the sewage filtered through the beds and passed into the stream. A white fungus started to grow upon the rocks in the bottom of the stream and the water was not purified—we claim that the bacteria failed to do their work because they were overfed—that is the reason we allow a bed to stand two weeks and further that the mere fact of the sewage filtering through the sand does not destroy the live germs of the sewage. There is very little odor arising from the filter beds unless such material as offal from slaughter houses pass through the screens and get onto the beds. The filter beds are farmed and we have raised several crops of good corn and vegetables, such as cabbage, celery, beets, potatoes, onions, etc. By farming the beds the soil is kept in a loose and porous condition. It requires only one attendant to operate the beds, and the expense of keeping the filter beds in repair is very small.

There are several kinds of sewage filtration systems, the chemical system, coke and septic tank, the merits of which I am not familiar with. We believe, after four years of practical use, the intermittent filtration system is a perfect system of sewage filtration.

Parks.

The Parks of London.

By G. A. Parker.

If a person were to take the map of London and stick a pin at the location of every square, common, or green spot he might not only be surprised at the number of pins it would take, but also to see how evenly they would be distributed over the entire city, yet gathered into groups somewhat like trees in a forest.

Colonel J. J. Sexby in his work on "The Municipal Parks, Gardens and Open Spaces of London," mentioned 249 areas containing 6,046 acres as open to the public, and there are many more semi-public spaces, which, with more or less limtations as to public use, let in health and happiness to the city. These last are estmated to contain about 1,200 acres.

There are no very large single parks inside the metropolitan limits, the largest being Regent's Park, of 472 1-2 acres; the next Hyde Park, of 361 acres. Tabulating the information as given by Colonel Sexby, we find as follows:

18 parks or squares, of 100 acres or more, containing	4,305.75	acres
11 parks or squares, from 50 to less than 100 acres, containing	747	acres
24 parks or squares, from 10 to less than 50 acres, containing	635	acres
111 parks or squares, from 1 to less than 10 acres, containing	320.705	acres
85 parks or squares, less than 1 acre, containing	38	acres
249 Total.....	6,046.47	acres

But a table of this kind is apt to give a wrong impression of the great park work of London, for by starting at the east end of Victoria Embankment one can pass through parks and gardens west to Kensington Palace over four miles aw_y, for practically Victoria Embankment, St. James' Park, Green Park, Palace Gardens, Hyde Park and Kensington Gardens are one park, being separated from each other only by streets, and grounds of public buildings. Then to the north only three-quarters of a mile from Hyde Park is the large Regent's Park and Primrose Hill. Here in the very midst of London are some 1,400 acres of the best landscape effects.

For over 500 years park work in some form has been growing in England, and it was about 1660 when the great French landscape gardener, Andre le Notre, the designer in whole or in part of the large and important parks and places of Paris, Rome and other continental cities, then in the prime of his life, designed the plan for Kensington Garden, St. James's and Greenwich Parks, yet the more modern park methods were commenced about 1850, and like all large and old cities, there is not a uniformity in the methods of their development and maintenance.

Again, to tabulate information as given by Colonel Sexby, it is found that:

No. of Parks or squares.	Maintained by.	Acres.
2....	War Office	199.50
11....	H. M. Office of Works...	1,461.50
80....	London County Council.	3,721.792
2....	City Corporation.....	4.05
37....	District Board of Works.	54.202
70....	Vestries	156.332
24....	Church Officers	28.094
16....	Corporations, etc	399.75
7....	Private persons	21.25
249		6.046.471

Besides these there are large parks, commons and heaths just outside, often referred to as belonging to London.

There are 75,442 acres inside the city limits; therefore, one acre out of 12 1-2 is given up to public use as parks or squares. The census of 1896 gives a population of 4,433,088, so there is one acre of park lands to 733 people. These ratios are favorable compared with other large cities, yet the larger and more dense the population the greater proportion of land should be used for open spaces.

The modern high buildings make it possible to do more business on a smaller surface area, and the telephone and other rapid means of communication makes the open areas of less interference than ever before in business movements.

One writer has said: "It has long been recognized that London owes a great deal of its physical and political health to its parks and open spaces." This was written a quarter of a century ago, a truth which has expanded and become more deeply felt since. What was once an ornament and luxury, the intensity of present city life is making a necessity.—"American Gardening."

To Make Contractors Pay.

The Supreme Court in the case of the city of Philadelphia to the use of the Rose Brick Manufacturing Company vs. Stewart, decided a question of great interest to all who do city work. On March, 30, 1896, Councils passed an ordinance requiring contractors for city work to give, in addition to the bond for the faithful performance of the contract, a penal bond that the contract would pay all sub-contractors and those who furnished material and labor upon the work. The defendant had a contract with the city, gave such a bond and received his pay for the work. The Brick Company then brought suit in the city's name to recover for material furnished to Stewart upon that contract.

The defense set up part payment by the giving of a promissory note, and that the suit could not be maintained because Councils had no power to pass such an ordinance. Common Pleas Court sustained the plaintiff, and Stewart appealed. Common Pleas Court No. 1 had a like suit before it against the same defendant, and it sustained the defense; that case was also appealed. The decision of the Supreme Court delivered in an opinion by Justice Mitchell covers both cases. He sustains the City Councils, and among other things says:

"It is the right as well as the interest of the city to secure good work upon its contracts for public improvements, and there is no better policy towards that end than to satisfy honest and competent workmen that they can rely on being paid. There being right of mechanic's lien against public work, the work and material men are to that extent in the contractor's power as to pay, and that fact has a natural tendency to produce skimped work and inferior materials by the class of men willing to run that risk. Against this risk the city is entitled to protect itself by enacting assurance from the contractor that he will pay his honest debts incurred in the city's work."

Finance.

To Tax Automobiles.

How to tax the smart automobile has been dextrously and uniquely solved by the clerks in the City Treasurer's office of Pittsburg, Pa. Owners of all vehicles which traverse the streets of the city have to pay an annual license, and regulations are prescribed determining what must be paid according to the capacity of the vehicle. These regulations do not seem to meet the emergency in the case of horseless vehicles. The solution is meeting with the approval of the owners of these "useless wagons," as they have facetiously been termed.

Vehicles of all kinds are assessed according to the number of horses required to draw them. A one-horse vehicle requires a $6.50 license; a two-horse vehiclea $10.50, and a four-horse vehicle, $12.50. The automobiles are a distinct innovation in Pittsburg this year, and when City Treasurer D. R. Torrence was asked how the lincense on them was determined he was at a loss to tell. The question had not entered his head before, and he was somewhat amused at the novelty of the thing. He went to one of the clerks and learned that the difficulty had been satisfactorily settled, and the explanation suited him. The clerks had decided to put a one-seated automobile in the one-horse class, and a two-seated vehicle in the two-horse class. About a dozen licenses have been taken out for horseless carriages already. There was no necessity to go after the owners and stir them up for the license, as all of them up to the present have voluntarily gone to the Treasurer's office after the license.

There will be a larger amount of money realized from vehicle licenses this year than ever before, Treasurer Torrence thinks. The city received last year about $46,000 from this source. This will be brought about by a new system of espoinage that has been adopted. Heretofore the City Treasurer has put the matter of watching for delinquents in the hands of special constables. These constables, it was claimed, were not any too energetic in prosecuting the work, and so it was decided to place the work in the hands of the city ordinance officers, and the results have shown the wisdom of the change by adding a great deal more to the Treasury receipts than before.

FINANCIAL CONTROL OVER MUNICIPAL RECEIPTS AND EXPENDITURES.

ORGANIZATION AND ADMINISTRATION OF CONTROLLER'S DEPARTMENT BY A PRACTICAL MAN —NOT A THEORIST.

By Albert F. Crosby,

Ex-Deputy Auditor, Cleveland, Ohio.

The necessity of financial control over municipal receipts and expenditures has been demonstrated time and again in every municipality of any size in the country; and the question is not at this time whether such control should exist, but how and by what authority should it be conferred, and in whom should it be vested.

Controlling power may be conferred upon municipal officials by municipal authority, either executive or legislative, or may be conferred by state law. The main object in vesting such controlling power, I take it, is to place a safeguard around all municipal transactions, and to establish general supervision over all city business, with a view to restricting such business to its proper and legitimate channels, and to assuring an exact and complete record of all such transactions.

If, however, the power of financial control be conferred by the municipal administration or executive authority, there would always be the dangerous condition attached thereto, that in cases of the execution of such control contrary to the interest or possible mandates of the administration, the controlling power might be taken away in the same manner, as well as by the same authority, as that by which it had been conferred. In other words, the authority of financial control, if held at all, would be limited by and subject to the administrative pleasure; in which case the entire procedure becomes a farce. The same objection holds good, although not to so great an extent, in the case of authority conferred by the legislative branch of the city government. What is needed is an absolute, standard authority of financial control, based upon a fixed quantity, and subjected to no fear of supersedence or overflow, so long as such authority is exercised within proper and legitimate limits. Such authority can only be conferred by state law.

Now shall this financial control be vested in a board of supervision or in an individual official, or controller?

It would seem that this question is effectually answered when we consider the trouble so often found with the work of a board of this character—that each of the individual members is naturally inclined to shift as much of the work as possible, and all the responsibility, if possible, on to the other members.

"What is everybody's business is nobody's business." In order to fix the responsibility in case of neglect or failure properly to carry forward the legitimate functions of a municipality, there should and must be an individual head—one on whom may rest either public approval or public censure, and who must consequently have the requisite authority to compel attention to duty, and obedience to rules laid down for the guidance of all public officers in the transaction of city business.

This naturally points to the vesting of financial control over municipal receipts and disbursements, and in fact, over all financial transactions, in an individual official—or city controller, to whom the public may look for careful, conservative and faithful supervision of public business.

The duties of a city controller as set forth in section 11, article V, of the Municipal Corporations Act, are of three separate and distinct classes—first, as an auditor, to examine, pass upon and audit all bills or vouchers for expenditures incurred by the municipal officials in the performance of their respective duties, or in the caring for the general municipal good and improvement. Second, as an accountant, to keep the records and accounts of the receipts and disbursements, assets and liabilities of the city; and third, as a statistician, to exhibit annually, or oftener, full and complete statements of the municipal transactions and financial standing.

In order that he may fearlessly and without prejudice perform his duties under the first head (that of auditor) it would seem absolutely essential that the comptroller be relieved of any political entanglements, or obligations, such as would almost of necessity arise should the office be one to be filled by general election—and from favor or obligations of any kind to the administration or executive officials, upon whose expenditures he must pass. The office must, therefore, be one to be filled neither by election, nor by the appointive power of the mayor, or other executive officer. The appointment of the controller by the votes of the legislative branch of the government, or city council, while open to the criticism that such bodies are too often subject to "inducement," as to how they shall cast their ballot, yet would seem the most available means of filling the office. I am, however, firmly of the opinion that a clause should be added to this section, providing that such officer, after having received his appointment, shall be removed only for misfeasance or malfeasance in office, and after due trial has been accorded him, upon written charges, before the body originally appointing him to office—thus practically removing all possible motive for seeking favor of voters, or legislators, or other officials, looking toward a "second term" or continuance in office—in a word, taking the office out of politics.

The controller must also be relieved, so far as possible, of all temptation to misdirect the use of public funds, either directly or by collusion with others; or in allowing such action to "pass muster." As a means to this end, I would suggest that all city officers, whose duty it is to collect money on behalf of the city be required to deposit same with the city treasurer daily, upon order or receiving warrant of the controller. Such receiving warrant may specify, upon the back or face thereof the source of revenue so collected, and the proper fund to which the same is to be credited, together with such other information as may be necessary and desirable. Such warrant should be issued in duplicate, the original to go to the treasurer, and be his authority for entry of the transaction of such business on the city records.

The collecting officer, when making application for a receiving warrant, should file a report with the controller showing what collections he has made, and turning over to him the numbered stubs of the receipts he has given for same. The controller will thus have a complete record of all monies received in every department of the city, while not touching a cent of same himself, and the treasurer, handling all the actual money, can receive and disburse only on the order of the controller.

A sworn statement should be sent daily by the treasurer to the controller showing all transactions of the day, which statement must agree in every particular with the records of the controller, and if the cash balances of the city are kept in banks or depositories a daily statement should also be rendered by such depository to the controller,—thus making the record complete. In case a depository is used, absolutely no money should be disbursed except by check duly authorized by warrant of the controller.

In the matter of disbursements the controller should be given full and complete authority to investigate to the fullest extent the validity of any and all claims presented for payment, and to refuse to pass upon any such claims until thoroughly satisfied of the correctness thereof. He should also be given authority to direct the method and conditions of such payment, and to insist upon proper restrictions and certifications upon vouchers before same are approved for payment. In the same manner as suggested for the receiving warrant, the voucher may have specified upon its face or back the fund and purpose to which such disbursement is to be charged.

The matter of accounting then becomes simply a record of receiving warrants and disbursing warrants arranged and classified according to the proper funds and municipal functions; to which record the books and accounts of the various departments, as well as of the city treasurer and city depositaries must be brought into daily balance. It is, however, of the greatest importance that the controller be given the utmost authority and control over the keeping of the records of each and every department, so that there be no financial transaction of any nature whatever without his sanction and approval. The best system of accounting ever devised is worthless unless enforced in every detail; at the same time there are often found many ways of evading the law, unless special attention is given to prevent such action; so that unless some one official shall have ample authority to order and direct the accounting in all departments, and at the same time the ability to properly dictate the method, and the "backbone" to enforce such directions and dictations, there is almost a certainty of slipping into a lax and careless manner of doing business, especially when, as is too often the case, the clerks are appointed on account of political prestige rather than ability to fulfill the duties of their respective positions.

It would seem far better also to have such authority conferred by state law, so that it can not be curtailed or abridged by action of other municipal officials, either executive or legislative, also to combine with the investment of authority a full and specific responsibility, so that any error or failure in the proper transaction of municipal business would revert not only to the minor officer or clerk making such error, but also to the official who had failed to enforce his authority to the extent of demanding and receiving exact, careful and correct work.

This brings us to the third or statistical duty of the comptroller. With records arranged as above suggested, the data for a complete financial report are always at hand (a simple footing of columns giving total of receipts or disbursements for each and every purpose) and the main question becoming one of proper analysis and classification.

The method of formulating an annual financial report for a municipality is as yet far from being satisfactory settled. It is a matter of growth, and, in fact, it is only in the last few years that the subject has been a topic for any general study or discussion. The great object for present settlement is an analysis or method of tabulating receipts and disbursements which will satisfy the demands of statisticians, and at the same time be so simple and practical as to appeal to municipal officials for immediate adoption, without entailing too great a change in their present methods.

Speaking from a practical standpoint, I believe I can say that no better classification of municipal functions has been presented than that suggested by Professor L. S. Rowe in a paper recently published in the "Annals of the American Academy of Political and Social Science," November, 1898, entitled "Classification of Municipal Receipts and Expenditures."

Such classification is eminently adapted to all municipal transactions, and I have found in several years' use of a very similar tabulation in the records and financial reports of the city of Cleveland that it meets all statistical demands, and is not so complicated but that it is easily grasped by the layman and general public. Further, such a system is not difficult to arrange and classify, both in the records and annual report, falling in harmoniously and naturally with a common-sense analysis of municipal transactions. The laws and regulations of each municipality may demand some additions to same in the way of detail, but as a foundation on which to rest the base of a municipal annual report I have found Dr. Rowe's classification satisfactory in every respect.

There is a senseless and exceedingly harmful habit into which the officials of many of our larger municipalities have lapsed—that of withholding their annual financial report for six months or a year after the close of the fiscal year for which such report is made. After the lapse of so much time many of the statistics have largely lost their value as matters of immediate interest, and "public control," which, after all, is the final and best authority, is lost sight of, through lack of interest and attention. Thus the main object of the compilation of an annual statement is frustrated by neglect on the part of careless officials. It is perfectly possible, using the methods of accounting suggested above, and formulating the annual statement along the lines of Dr. Rowe's schedule, to complete such a report in from thirty to sixty days, including all details, and the main facts and figures, showing all the material required for general information should be ready for publication within twenty-four hours after closing the books for the fiscal year.

Now a word as to the man. In order to perfect the execution of the plans and methods set forth in the municipal corporations act, it is absolutely essential that a man be chosen as controller, who is not only of sterling integrity and exceptional executive ability, but who is willing to devote his life to the broadening and perfecting of the financial branch of municipal government. He must be a man of not too advanced age, or he will lack the vigor and energy necessary to the taking a firm stand on questions of importance, and maintaining same against all opposition; at the same time he must have acquired the ability and conservatism of matured experience. He must be an accountant of unquestioned ability (an expert, if possible) broad enough to receive and examine any proposition tending toward the advancing and improving of the functions of his office—able to teach—willing to learn.

The duties of the controller's office are not learned in a day or a month. Two years' work will not much more than familiarize a man with the foundation principles. The men who serve in his office are not always of the best. The controller must make competent clerks out of carpenters, shoemakers, or (more difficult still) politicians; must be able to show all his clerks how to perform their work, or in case of urgency, do it for them; must know how, when and what each clerk is doing, and how to correct same if necessary. From one to two years' preparation is not more than enough to fit the most competent to fill the position of controller in a large city, and every additional year will increase greatly his ability, knowledge and experience.

The only change I would suggest in the municipal corporations act, other than to further specify the authority and responsibility of the controller, is to make the tenure of his office to continue during his life and good behavior. I am fully convinced that a system of municipal government laid out along the lines of the municipal corporations act, especially in the department of finance, will be a vast improvement over any now in existence. The plan in general tends towards the development and broadening of government, and the betterment of municipal offices and officials.

1. This paper was read at the fifth annual meeting of the National Municipal League, at Columbus, O., in Nov. 1899, and published here for the first time by the courtesy of that organization, the full proceedings of which will soon appear in book form. —[Editor.]

DEPARTMENT OF INQUIRY.

The Editor of "City Government" will undertake to furnish, through this department, replies to all inquiries pertaining to municipal affairs sent in by subscribers.

Discussing City Ownership.

City Clerk's Office, ———, Pa., May 27, 1900.
Editor of "City Government:"

We are discussing the question of municipal ownership of an electric light plant. Can you supply us with some late statistics upon the question?

"City Government" published the preliminary report of the Baltimore Electric Light Commission in the March issue. That will give you the latest statistics upon the subject, which will include both private and municipal plants.—[Editor of "City Government."

What Is the Cause for Bad Odor and Taste in Water?

———, Va., May 19, 1900.
Editor of "City Government:"

I wish you would ask your readers, who are superintendents of water plants, for their experience with algae and ther causes of bad taste and odors in water. Our system has never been affected by anything of the kind until this season. The cause does not appear to be algae in our case. For this reason I would be glad to have your readers give a detailed description of their experience. As I do not care, for obvious reasons, to have my address printed, it will not be necessary for them to do so, therefore they can speak frankly. J. E. C. S.

Many water plants all over the country are making similar complaints and it will be of general interest if our readers will discuss this question freely and, if possible, identify the cause and discover a remedy.—[Editor of "City Government."

Cost of Electric Lights.

Mattewan, N. Y., May 26, 1900.
Editor of "City Government:"

Will you please give me statistics regarding electric lighting in Cohoes, Watervliet, Lansingburgh and Troy so that I may know the number of lights, candle power and the price per lamp per night on an all night schedule? C. H. WATSON.

Cohoes, N. Y., pays $75 per arc light for an all night and every night service, 143 lights of 2,000 nominal candle power are used. The city receives nothing for the franchise.

Watervliet, N. Y., has a municipal plant. 175 lights are used of 2,000 nominal candle power, costing about $69 per lamp. All night and every night service.

Lansingburgh, N. Y., has a private plant; pays nothing for franchise; furnishes 210 arc lights at $94.90 each of 2,000 nominal candle power; all night and every night service. If a light is not burning for a period of two hours during any given night the city deducts at the rate of a full night.

Troy, N. Y., has 407 lights of nominal 2,000 candle power, which burn all night and every night, at $129.57 per arc light per year.—[Editor of "City Government."

Street Cleaning Statistics.

In response to several inquiries for statistics about the cost of cleaning streets in the leading American cities the Editor of "City Government" gives the following information which has been recently compiled:

City.	Annual cost of street cleaning	Paid per mile	Paid per 1,000 square yards
New York	$3,336,879	$2,042	
Chicago	328,637	243	
Philadelphia	533,745	494	
St. Louis	130,000	1,585	$ 68
Baltimore	220,000	592	
Boston	330,328	675	35
Buffalo	153,853	455	
Milwaukee	83,132	1,108	41
Washington	148,000	704	
Jersey City	† 31,000	310	17
Indianapolis	38,000	431	25
St. Paul	33,920	753	35
Providence	45,092	1,156	64
Toledo	37,413	299	19
Omaha	18,716	228	10
Syracuse	80,445	2,234	101
Columbus	62,191	536	22
Scranton	12,000	705	35
Worcester	11,444	1,040	48
Paterson	* 50,000	769	41
Memphis	41,000	493	30
Richmond	60,000	2,608	
Dayton	†† 12,394	399	17

† Exclusive of snow.
†† Does not include cleaning of 97,000 square yards.
* Cost of repairing included.

Oil Used to Sprinkle Roads.

Lansingburg, N. Y., May 27, 1900.
Editor of "City Government:"

In a recent number of your magazine reference was made to the use of crude oil for settling the dust of the streets. Do you know of any considerable number of towns where this method is employed? K. H. F.

According to "California Municipalities" the practice is quite extensive in Southern California, with satisfactory results. The account of an investigation in one town follows:

At Redlands, Cal., about 15 miles of its streets were sprinkled with oil in 1899, the city paying $15 per 95,000 square feet for the right to use oil on roads, the cost to the city being $4,416.45. The streets were sprinkled to a width of 24 feet and the estimated cost was eight cents to running foot, of which the property owners paid one-half and the city the balance. The city did the work and the results were satisfactory, the dust being effectually laid by one to three applications during the period from July to October.

At first there were some complaints of ruined cloths and carpets occasioned by the greasy dirt sticking to shoes and wagon tires, but after the oil had been absorbed there was no more cause for complaint in that respect. The soil of the road-bed sprinkled varies from a red clay to a sandy gravelly loam and the best results obtained were on the harder soils where the oil had been allowed to dry instead of being worked in by the Decamp method, such places presenting a smooth asphalt surface that could not be broken into except by a sharp instrument, the ordinary travel making no impression upon the surface.

The sandy and lower streets of the city that had been oiled and then worked by the machine, presented a dusty surface and on the main thoroughfares water was being used to settle the dust. The streets having a flat surface, or a very slight crown show the least effect of the oil.

The universal opinion was in favor of the use of oil in preference to water; a thorough preparation of the road-bed by crowning and rolling to precede in either case.—[Editor "City Government."

PERIODICALS.

LIBRARIES OF RHODE ISLAND. THE—By Henry Robinson Palmer. New England Magazine, June.

REVENUE WITHOUT TAXATION. By the late Robert Ewen. Westminster Review, (English) May.

WATER OF THE GREAT RIVERS OF INDIA. VALUE OF THE—Blackwood's Edenburgh Magazine, (English) May.

GAS AND GAS METERS. (Illustrated) By Hubert S. Wynkoop. Popular Science Monthly, June.

LATITUDE AND LONGITUDE AMONG THE REFORMERS. By Theodore Roosevelt. Century Magazine, June.

THE CITY IN HISTORY. By L. S. Rowe. American Journal of Sociology, May.

A NEGLECTED PRINCIPLE IN CIVIC REFORM. By James H. Hamilton. American Journal of Sociology, May.

THE SCOPE OF SOCIOLOGY.—III. By Albion W. Small. American Journal of Sociology, May.

A SOCIOLOGICAL VIEW OF SOVEREIGNTY. (Continued) By John R. Commons. American Journal of Sociology, May.

STREET RAILWAY EMPLOYEES IN PARIS. By Edmond J. James. American Journal of Sociology, May.

AMERICAN LIBRARIES. By W. H. Brett. The Dial, May 1.

ALGAE AS A CAUSE OF THE CONTAMINATION OF DRINKING WATER. Sanitarian, May.

CONTENTS, (in part) OF JUNE SANITARIAN:

SUPPRESSION OF EPIDEMICS. By Walter Wyman, Surgeon General, M. H. S. Recently Improved Methods of Sewage Disposal. By Dr. Garstang. The Septic Tank. By Geo. N. Bell. Communicability and Restriction of Consumption. By H. B. Baker.

CONTENTS, (in part) OF MUNICIPAL AFFAIRS, MARCH:

PUBLIC OWNERSHIP AND THE SOCIAL Conscience. By R. Fulton Cutting. Shall American Cities Municipilize? By John G. Agar. Municipal Telephones in Amsterdam. By Ph. Falkenburg and J. H. Van Zanten. Street Railways in British Towns. By Robert Donald. Glasgow's Municipal Tramways. By Milo R. Maltbie. Syracuse Water Supply. By James H. Hamilton. History of Public Franchises in New York City. By Gustavus Myers. Municipal Ownership of Docks in New York City. By Bird S. Coler. Street Railway Problems in Milwaukee. By John A. Butler. Boston Municipal Subway. By B. L. Beal.

MUNICIPAL ASSOCIATIONS.

Program of Municipal Electricians.

The Executive Committee of the International Association of Municipal Electricians held a meeting at the Clarendon Hotel, Brooklyn, N. Y., May 17th.

The meeting was presided over by Captain William Brophy, president of the Association, and the following officers and members of the executive committee were present:

William Brophy, G. F. MacDonald, Adam Bosch, Burt C. McAllister, Morris W. Mead, W. Y. Ellett, J. W. Aydon, F. G. Boyd and F. C. Mason. F. G. Boyd of Baltimore acted as secretary pro tem.

Four topics were selected for discussion at the next meeting at Pittsburgh, Pa., September 25th, 26th and 27th as follows:

"Benefits to be Derived from Our Association."

"Contact Points," Frank C. Mason, Superintendent of Brooklyn Police Telegraph.

"Trials and Troubles of Instituting and Enforcing Municipal Inspection and Control," M. G. Canfield of Grand Rapids, Mich.

"Automatic Fire Alarm Systems," Chas. Burger of Boston.

Taxpayers' Unions.

Secretary Fanning of the Cleveland (O.) Municipal Association is full of good ideas for the betterment of civic conditions. An excellent characteristic about them all is their practicality. His latest venture is the "Ward Taxpayers' Union." The following is a proposed form of constitution:

"1. This organization shall be known as the — Ward Taxpayers' Union.

"2. The objects of the organization shall be to co-operate with the decennial appraiser, to protect the interests of the taxpayers, to advocate a business-like and efficient management of the legislative, executive and judicial branches of the city and county government, and to promote co-operation among the taxpayers and citizens for the improvement of this ward and city.

"3. The — Ward Taxpayers' Union shall be composed of resident taxpayers and voters.

"4. The officers of the — Ward Taxpayers' Union shall be a president, vice-president, secretary and treasurer, and an executive committee of five persons who shall co-operate with the appraiser in the appraisements of realty."

An Invitation to Join.

The Baltimore "American" received the other day a letter from the Secretary of the League of American Municipalities, asking that inquiry be made into the causes of the persistent refusal of Baltimore to become a member of the league. This has been done. Mayor Hayes declares that he has no recollection of receiving any communication from the league, but after carefully studying the prospectus, said that he was in thorough sympathy with the object and he had no doubt Baltimore would derive benefit from belonging to such a body. While this city has never been a member of the league, a representative of the city government has attended more than one of the three annual conventions the league has held. This representative was sent by Mayor Malster in response to the league's invitation, but the City Council has turned down a resolution providing for permanent membership in the league. So that is the way the matter stands.

The cost of membership in the league is a small matter. For a city the size of Baltimore the dues are $60 a year, payable in advance, and such membership would entitle every city official, executive and legislative, to all the privileges of the league, including the unlimited service of the bureau of information. The city would also be expected to pay the expenses of delegates sent to the annual meetings of the league. Probably $200 would cover the whole annual expense, and if membership in the league is worth anything at all, it is certainly worth that sum.

The next meeting of the league will be held in the fall at Charleston, and nearly every American city of any account, and some that are not of much, will be represented. Over 130 cities are now members, but Cumberland is the only one in Maryland that has yet joined. The objects of the league are well known, and its work has frequently been discussed by "The American." It aims at a practical study of municipal problems, and, through its bureau of information, keeps each member posted on the results of city experiments made by other members. Municipal government is always an interesting study, and every American city has yet much to learn on the subject. Baltimore should treat the invitation to join with proper consideration and not throw the secretary's letters into the waste-basket without even opening them.—"American," Baltimore.

The Voters' League of Chicago.

By Edwin Burritt Smith.

The general membership of the Chicago Voters' League is composed of voters, who sign cards expressing approval of its purposes and methods, says Edwin Burritt Smith in the June Atlantic. No general meetings of the members are held; but circular letters advising those in a given ward of the local situation are frequently mailed during aldermanic campaigns to secure a wide co-operation. At the opening of its second campaign the League mailed a pamphlet to every registered voter in the city, giving the history for some years of franchise legislation by the council, with a full report on the records of retiring members. Since its work has become thoroughly known, the general publication by the newspapers of the reports and recommendations of the League is very effective. Its facts and conclusions are usually accepted by the press, and no substantial newspaper support can be had for candidates whom it opposes.

The League makes no attempt to keep up the usual pretense of direct representation of its general membership. No claim is made that the action of the executive committee represents any save those who approve it. The facts upon which such action is based are always given. The appeal is directly to the individual voter, by means of specific recommendations supported by the salient facts. In due time before nominations are made a full report of the official records of retiring members of the council is published, with specific judgments as to their respective fitness for defeat or re-election. On the eve of the election a like report on all candidates is published for the information of the voters. It is assumed that the main issue is upon character and capacity. The voters are, however, advised whether a given candidate stands on the "League platform," which is a pledge to exact full compensation for franchises, support the civil service law, and unite with others to secure a non-partisan organization of the council.

The League is entirely non-partisan. The members of its executive committee want nothing for themselves. It strives only for the council. This one thing it does. It makes no fight, as yet, on "the machine" as such. Its fundamental purpose is to inform the voters of the facts about all candidates. There is nothing that the city statesman of the ordinary spoils variety so dislikes as a campaign in which the issue is upon the facts of his own record. He abhors such an issue as nature abhors a vacuum. He prefers a campaign conducted on broad national issues. He regards discussions of the tariff and the currency as of much greater educational value than the facts of his own modest career. In this he is much mistaken. The League has demonstrated that there is nothing of such interest to the voters, on the eve of a municipal election, as an authoritative statement of these suggestive facts.—"Atlantic Monthly," June.

State League of Pennsylvania.

Shortly after the meeting of the League of American Municnpalities at Syracuse last August, Mayor Depinet of Erie, Pa., who attended that convention, called a meeting of the mayors and other city officials of the third class cities of Pennsylvania at Harrisburg. At that time the temporary organization was effected and York was selected as the meeting place for the first convention.

In accordance with the provisions of that gathering the first convention was held at York on May 15-16. It was largely attended and several municipal problems,—such as municipal ownership, sewage disposal, crematory treatment of garbage and municipal accounting,—were warmly discussed.

Those present were enthusiastic in their endorsement of the general usefulness of such an organization and predicted a still larger gathering at Erie next year, the place selected for the next meeting. The following officers were chosen for the ensuing year:

President, John Depinet, Mayor of Erie.

Vice President, E. F. Giles, Mayor of Altoona.

Honorary Vice Presidents—John Schwald, City Solicitor, Allentown; F. P. Schoonmaker, City Solicitor, Bradford; Howard H. Huston, member Select Council, Chester; Dr. B. Rush Field, Mayor of Easton; C. F. Hummel, Select Council, Erie; Chas. A. Miller, City Clerk, Harrisburg; E. P. Smeltz, City Clerk, Lancaster; C. Gerhart, Mayor, Lebanon; William F. Elliot, Mayor, Lock Haven; Robert J. Black, Mayor, McKeesport; E. W. McArthur, Mayor, Meadville; Adam H. Leader, Mayor, Reading; Bernard McManus, City Treasurer, Wilkesbarre; M. B. Gibson, member Select Council, York.

Treasurer, J. Craig, Jr., Treasurer of Easton.

Secretary, J. F. Frank Gable, City Clerk of York.

Trustees—Dr. B. Rush Field, Mayor of Easton; Joseph Main, City Controller, Wilkesbarre; George A. Saltzman, President Common Council, Harrisburg.

Mayor Gibson of York, who was recently elected Mayor to fill out the unexpired term of the lamented Mayor Giese, covered himself with glory as a host and made his guests feel at home from the moment of the first greeting.

The committee on constitution reported the following which was adopted:

ARTICLE I.

Name and Objects.

Section 1. The objects of this organization, which shall be known as "The League of Cities of the Third Class in Pennsylvania," shall be the advancement of the various interests of said cities, and the promoting of such remedial legislation as may be deemed necessary and essential for the government of said cities, and for the discussion and interchange of any and all topics relating to the welfare and conduct of the same.

ARTICLE II.

Membership.

Section 1. Any municipality in the State of Pennsylvania, which, under its laws, is a city of the third class, may become a member of this organization.

Sec. 2. Each and every municipality becoming a member of this orgfianization shall pay an annual membership fee as follows:

Cities not exceeding 25,000 population, $10.00.

Above 25,000 and not exceeding 50,000, $20.00.

Above 50,000, $30.00.

ARTICLE III.

Section 1. The annual meeting of this organization shall be held at such place as the annual convention may determine, and at such time as the Executive Committee may fix.

Sec. 2. Each and every municipality holding membership in this organization shall be entitled to send as delegates to the annual convention its Mayor, City Solicitor, City Controller, City Clerk and one member of each branch of Councils of said cities, also City Treasurer and City Engineer.

Sec. 3. On all questions each and every municipality shall be entitled to one vote, which shall be the majority expression of such municipality's delegation. All delegates shall be entitled to participate in the discussions and debates of the meetings.

ARTIVLE IV.

Officers.

Section 1. The officers of this organization shall consist of a President, Vice President, Secretary, Treasurer, three Trustees, each of whom shall be a municipal official at the time of his election, except the secretary, and no two of whom shall be from the same municipality. Said officers shall be elected annually and shall constitute the Executive Committee for that year.

Sec 2. There shall be appointed at each annual meeting an honorary Vice President from each city represented, and such Standing Committees as the President or convention shall deem necessary.

ARTICLE V.

Duties.

Section 1. The President shall preside at all meetings of the organization and at those of the Executive Committee; shall have the appointment of all committees, and shall perform such other duties as are incumbent on the office. In the absence of the President, the Vice President shall assume and perfrom the duties of the office.

Sec. 2. The Secretary shall keep accurate minutes of the proceedings of the organization and of the Executive Committee; shall have charge of the Bureau of Information; shall conduct all correspondence; shall issue notices of all meetings of the organization; shall collect and receipt for all fees and dues and pay them to the Treasurer monthly, taking and keeping a receipt for same and keep accurate account between the organization and its members, and shall receive such compensation and give such bond as the Executive Committee shall determine.

Sec. 3. The Treasurer shall receive from the Secretary and keep all money belonging to the organization, giving his receipt therefor; shall pay all bills approved by the President; shall keep an account of the funds of the organization, and submit to it at each annual meeting a report of all receipts and disbursements during the preceding year, and shall give such bond as the Executive Committee may determine.

Sec. 4. The bonds provided for in the two preceding sections shall be in some solvent security company, and the premiums thereon shall be paid by the organization.

Sec. 5. The Executive Committee shall meet on the morning of the first day of the annual meeting of the organization, and as often as the President may direct, and consider and report all matters referred to it by the organization.

ARTICLE VI.

Bureau of Information.

Section 1. The organization shall establish and maintain, under the care of the Secretary, a Bureau of Information for the purposes as set forth in Section 1, Article I, of this constitution.

Sec. 2. It shall be the duty of each and every member to take such action as he may deem proper, through his Mayor and Councils, to have the heads of the various departments send copies of all published public reports to the Bureau of Information, and to have said officials extend all reasonable courtesies to said Bureau in the way of furnishing special information as requetsed.

Sec. 3. It shall be the privilege of each and every member, through its Mayor and Councils, or heads of various departments, to request any special information relative to municipal work from the Bureau of Information.

Sec. 4. It shall be the duty of the Bureau of Information to comply with all reasonable requests made by members for information, and to publish all generally interesting information gathered and compiled by it.

ARTICLE VII.

Order of Business.

Section 1. At the annual meeting of the organization the order of business shall be as follows:

1, Roll call; 2, reading of minutes of last meeting; 3, President's address; 4, report of secretary; 5, report of treasurer; 6, report of executive committee; 7, report of other committees; 8, addresses, papers and discussions; 9, election of officers; 10, election of next place of meeting.

ARTICLE VIII.

Amendments.

Section 1. The foregoing Constitution may be amended at any annual meeting by a two-thirds vote of the members present, providing such proposed amendments shall have been submitted in writing not later than the first day of the annual meeting.

TRADE NOTES.

—Oswego, N. Y., is examining voting machines; there are on exhibition the United States, the Standard and the Bardwell.

—The Buffalo Water Meter Co. was well represented at the American Water Works Association held at Richmond last month.

—The Builders' Iron Foundry of Providence, R. I., had an exhibit at the recent meeting of the American Water Works Association at Richmond.

—Secretary A. G. Holmes of the Pittsburg Meter Co. and several of his traveling men were present at the American Water Works Association at Richmond.

—W. F. Morse has been appointed manager for the United States of three foreign manufacturers of garbage incinerators and is forming a company for their sale.

—The city of Cambridge, Mass., recently purchased four street sweepers from the Charlton Manufacturing Company, of New York, which are giving good satisfaction.

—The United States Government has just placed an order with the New York Filter Manufacturing Company, 26 Cortland street, New York, for a large filter plant to furnish filtered water for the Experimental Model Basin in the Navy Yard, Washington, D. C.

—Mr. E. E. Price, Montauk Multiphase Cable Company, 100 Broadway, New York city.—Dear Sir: As per your request regarding the installation of call bell and fire alarm system which you installed in our store, using Montauk Multiphase Cable, I beg to state that it has given us entire satisfaction, both for call bell and fire alarm purpose. We are using this system continuously to call out our private fire department for practice. Yours respectfully L. S. Plout & Company.

Advertising Pays.

Note was made, last month, of the large output of Seagrave trussed ladders, trucks and wagons, and we learn with pleasure that over forty additional orders are already on hand and more coming.

Good articles are appreciated by progressive fire departments and "City Government" has freely praised Seagrave products because they are good.

Garbage Plant Bids.

Milwaukee, Wis., Board of Public Works has received bids for the use of patented devices in the erection of a plant for the disposal of garbage. The "Evening Wisconsin" quotes:

Thackeray Incinerating Co	$8,500
The Engel Co	12,500
Gustave Podoll, (McGlehen System)	12,000
American Incinerating Co	17,800
The Dixon Garbage Crem. Co	24,000

Fire Protection.

The question of fire protection is generally being met by experts in different lines. The Montauk Multiphase Cable Co. has found a means for the protection of life and property in its "Fire Detecting Wire," which should be used in all wiring for electric bells and lights.

"A practical illustration of the capabilities of this fire detecting wire was given at the recent fire on the premises of Messrs. Brooks, M'Glashun & M'Harg in Flinder's Lane, Melbourne, where the Montauk Fire Cable is installed and connected with the Metropolitan Fire Station through Kirkby's fire alarm instruments. The first intimation of the outbreak was given through the fire alarm instrument in the building, this being actuated automatically by the fusing of the Montauk Fire Cable on the top floor. The utility of the apparatus for the purpose of notifying the existence of fire to the proper quarters is thus proved beyond doubt. As the fire occurred during the day-time it was only natural that it was soon observed by some of the many employees of the firm and passers-by, and soon after the automatic call was sent in, two or three other calls were received by the Fire Brigade. But the fact remains that the cable did act, and would have acted under the same conditions at any time during the day or night, as the principle involved in its action is a natural law that never fails. The introduction of the Montauk fire cable into a building gives as much security as if watchmen were on guard in every room or closet, nook or corner, but with the important difference that the cable never sleeps."

Corporate Ownership.*

By Grier Hersh, York, Pa.

It must be apparent to every thoughtful man that there is a demand for changes in our system of government. There is an actual need for reform of abuses that have arisen in our economic system. Reformers seeking for a panacea to cure all ills have advocated the governmental ownership of all public utilities. This is a proposition in direct opposition to the idea of free government. Governmental forms are subject to the laws of evolution in the same manner as the individual in all species of life. No system of government can be perfect. The varying and changing conditions of life under the laws of evolution, demand a corresponding modification in state management. After ages of struggle the highest type of government was reached in America, in the grant to the masses of political equality. To this political equality is added the doctrine of the non-interference of the state. Mills, its greatest advocate, defines it as "a restricting to the narrowest limits the intervention of a public authority in the business of a community." And further adds, "Letting alone should be the general practice and that every departure from it, unless required by some great good, is a certain evil."

So far we have considered the question in its theoretical relation to national and municipal government. Let us examine it as a business proposition. Let us estimate the benefits to be derived from municipal ownership in comparison with those from proper regulated and restricted grants of public franchises to the individual or to the corporation. It has been urged that all public utilities should be operated by the municipality to its own advantage, and that whatever of profits, would be a distinct gain in revenue. This idea of operation presupposes some higher power than the individual units of a community. The municipal government is in effect a corporation managing the property of the citizens. It owns nothing, it has no funds. The money with which utilities are to be established must come from the individual. The issue of municipal bonds is the creation of a prior lien, voluntary or involuntary, on the private property of the individual. It is the pledge of private real estate as a collateral security for a public enterprise. The essential difference between public and private ownership is that the one is enforced and involuntary and the returns are communal, while in the other it is voluntary and the returns are solely to the voluntary investor. This municipal ownership cannot be regarded as an adequate off-set to the enforced property pledge, for the division of the profits, if any, are made to all individuals, whether they are property owners or not, while the loss, if any, is to those whose proerty is pledged. The attempt to derive an increased revenue by the operation of utilities carries with it the assumption of grave responsibilities. The consideration of risk aparently does not enter into the argument. The inauguration of each public enterprise marks an era in the development of the city. With it comes increase in wealth, increased value of assessable property, and a corresponding increase in revenue.

The owner of a utility is not only compelled to meet present demands but to prepare for those of the future. He must extend his improvements to the farthest outlying districts and beyond the point of immediate profitable return. This is an essential and desirable factor in the future prosperity of the community. However, such extension of utilities must be regarded as a business risk and is in essence a speculative venture. Its estimate of returns must be based on calculation. No municipality has a right to use the property of its citizens as a collateral pledge or security, to enter any business venture of a speculative or undetermined nature. This risk must be assumed by the private corporation under prescribed regulations. By this method the municipality takes no risk on future prosperity, and will receive a stated income. Take, for instance, the town of Lancaster. Its railway system is highly developed for a city of its size. The corporate owners entered into a speculative venture, the calculations of which were not confirmed by returns. It has been a loss to the investors, but the municipality has been the gainer. Taxes have been received and certain portions of the streets paved. The value of property has been raised and the citizens have gained accommodations of transit far beyond their needs, as measured by the returns. Was it wisdom or not for this municipality to grant this franchise or should it have been owned and operated by the city government, with all the risks of failure. A municipality can illy afford the loss in an unprofitable ownership, and the prospective earnings are not of sufficient or commensurate amount to justify a commercial risk.

It is further urged that wherever tried municipal ownership has proved a success. And that by reason of more careful and economic management, both the municipality and the individual receive these commodities at lower prices. This is not borne out by facts. The laws which compel short terms of service create continuous changes in the personality of the administrators. In large business enterprises changes in management are dreaded and there is a constant effort to continue a capable manager through a long term of office. No matter how honest, or high the ambitions for pure government of the Mayor and his assistants, their short term of service precludes a continuous advantageous management. Moreover, under our system of clean sweeps at each election the probability of economic management is remote. The proverbial slowness with which municipalities are prone to act is a factor in economic management. The quickness of corporate management enables it, by taking advantage of improved conditions, to outstrip the municipality in methods of economy.

For comparison it must be remembered that the contract price of the municipality with the corporation for a given commodity is not the actual price. The franchise taxes must be deducted to arrive at the actual cost. For instance, York pays $76.65 for electric lights, but the actual cost, by the deduction of the taxes paid by the companies, is approximately $74.

Many places which advertise great economy in the management of their utilities are forced when a rigid system of commercial bookkeeping is applied, to admit not gain, but loss. Municipal calculations, especially in electric lighting, of the cost of lights is the division of the expenses of operation by the number of lights in use. The taxes on the bonds and the sinking fund, being arranged by the application of other taxes, is not accounted, nor is there a deduction made of the loss of income received from the retiring corporate owner. Chicago claimed a cost of from $60 to $90, but when properly accounted it rose to over $160, while the retiring corporation was making a profit at $107. Detroit showed a cost of $84, while the actuil cost was $140. While there may be and theoretically is, a saving in the municipality, it cannot be assumed as a fact, nor be used as an argument until it is proven to me a fact, not in specific cases, but in general application.

It is further urged that all corporate ownership is an incentive to bribery and corruption and that when the citizens become the actual owners of utilities, that they will be aroused and that this corruption and bribery will be considerably modified, if not obliterated. All question of corruption in the administration of municipalities is in great measure foreign to the consideration of the subject. This assumption is not borne out by the history of those cities which have been the owners of utilities. The citizens have even failed to demand a proper distribution of taxes and there is a general apathy by men of intelligence to interest themselves in municipal affairs. Neither the advocates of municipal, nor those of corporate management can fairly urge this as an argument. Pure and honest administration is in the hands of the people and there is a growing desire to correct past abuses and to see that the public interests are capably and honestly managed. Under present conditions however the burden of proof is on the advocates of municipal ownership to show that this additional power given to the politician will not be detrimental to the public good.

Cities of the third class in this state, by reason of their charters are illy adapted to undertake ownership, as the power of legislation and administration is in the councils themselves and where there is a tendency to ring rule, it can easily be fostered and encouraged. Under any conditions this law should be so changed that the administrators should be appointees of the mayor, removable at his pleasure and be responsible for all real administration of office.

* An address delivered before the first annual convention of "The League of Cities of the Third Class" in Pennsylvania, at York, May 15-16.

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Municipal Gas Plants.

By Mayor Chase, Haverhill, Mass.

Is municipal ownership of gas plants successful? I answer most emphatically, Yes. I am aware of the fact that there are those who claim that American cities do not make a success of municipal ownership to such an extent as such cities as Glasgow and Berlin have done. This is true only in a degree.

Wherever municipal ownership has been tried in this country it has been successful, with hardly an exception. The only reason why it has not been successful in this country as in some others is because we have not attempted as yet to apply the principle to anything like the same proportion that has been done in Glasgow and Berlin.

Figures can be given in abundance to prove that, from a financial standpoint, municipal ownership in this country has been highly successful in almost every instance, and this being the view-point from which most men of to-day look at this question, I will consider the question from this point.

From Brown's Gas Directory for 1891, we find that there were eight private gas companies and four municipal plants in Virginia. Six of the eight private gas companies charged from $2 to $3 per thousand feet of gas, and the average for the eight companies was $2.11 per thousand feet. Three of the municipal plants charged $1.50 per thousand feet of gas, one of them $1.44 per thousand and the average cost to the people for operating expenses and all fixed charges was $1.17 per thousand. In West Virginia there were five private plants and one municipal plant. One private company charged $1, another $1.60 and the other three $2 to $2.25 per thousand. The public works in Wheeling charged 75 cents per thousand. The public works in Philadelphia charged $1.50 per thousand, but 60 cents of it was clean profit in the city treasury. Of the 89 private companies in Pennsylvania 26 charged $2 and over 55 companies charged over $1.50 per thousand; eight charged $1.50, and only eight companies made a rate as low as $1 per thousand, and they were located where coal was much cheaper than in Philadelphia.

In Kentucky none of the 18 private companies sold gas as low as the public works in Henderson.

In Ohio there were two public plants. The public works in Hamilton supplied gas at a total cost of $1 per thousand—39 cents of which was for interest, and the public works in Bellefontaine, being free from debt, supplied gas at a total cost of 63 cents per thousand. Of the 43 private companies only five made as low a rate as $1. The rival plant in Hamilton was forced down by competition with the public works plant.

It appears from the foregoing figures, that the public plants made a splendid record and supplied gas to the people at a much less figure than the private plants.—"Appeal to Reason," Kansas.

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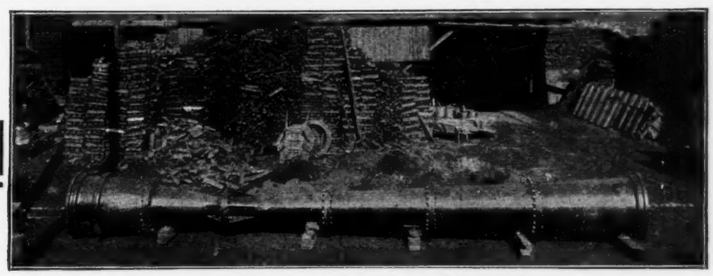

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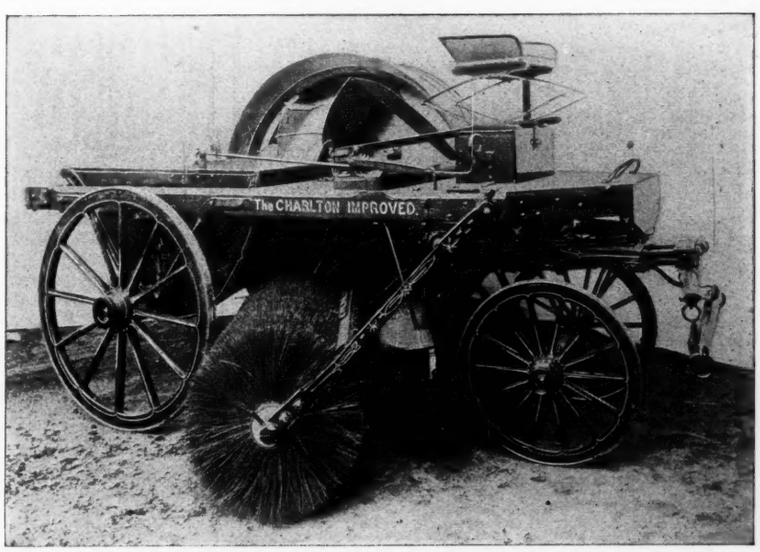

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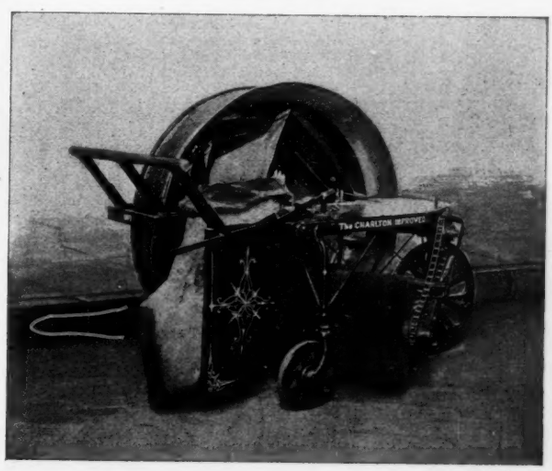

Weight, 215 pounds. Length of Broom, 2 ft. 3 in. Diameter of Wheel, 3 ft. 6 in. Length of Frame, 4 ft. Width of Frame, 27 in.

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Long Term Contract Permissible.

Two years ago the asphalted streets of Scranton, having mostly gone out of bond, were permitted by neglect, to disintegrate until on some of the main thoroughfares there was almost as large an area of pit holes as of asphalt. The Street Commissioner tried to apply the temporary remedy of filling the holes with concrete, but on the business streets this proved ineffectual, inasmuch as the concrete was soon ground into dust.

The demand for street repairs having become formidable, one element in Councils urged the purchase of a city repair plant, but the Board of Trade and many substantial business interests, having little confidence in the ability of the city as at present governed to conduct efficiently or economically a public work of that character, and recognizing that the city's treasury, then hard-up for ready money, could not, without a special bond issue, afford the large initial outlay necessary to resurface a large proportion of the more than 200,000 square yards of paving out of or soon to be out of bond, insisted upon a long term contract putting the responsibility for repairing the asphalt on a private contractor. Bids on this basis, for a ten-year term, were solicited and the contract awarded to the lowest bidder. The validity of this proceeding was questioned in the courts in an equity suit. Charges of fraud in the securing of the contract were advanced but subsequently withdrawn; and the point of contention finally narrowed down as to whether the municipality had the power to bind itself in a ten-year contract for such a purpose. The case was decided by Judge Archibald, of the Lacka County Common Pleas Courts in the city's favor. Below is the essence of his opinion:

"It is contended," the judge remarks, "that municipalities are required to pursue a 'pay as you go' policy, annual revenues being collected and annual appropriations made for annual needs. This, the court says, may, to an extent, be true, it certainly is not absolute and unbending. Speaking of the argument that the contract in controversy is for a municipal duty specially excepted, out of those which are required by the statute to be performed by contract let to the lowest bidder, Judge Archibald says that the "ordinary repairs of highways" are no doubt excepted, but the repairs contemplated in this contract are not "ordinary," but on the contrary, "extraordinary."

"It may be," the judge says, "that it would be to the decided advantage of the city to equip itself to do its own repairs, but the Mayor and Councils who passed the ordinance authorizing the contract, apparently, thought otherwise, and, over their judgment we have no control. The conditions, at least, were not ordinary, and they had a right to meet them as they have met them, and, assuming that the city was not in shape to do its own repairing, the contract extending over a term of years was the only reasonable and economical way of meeting the problem.

"By it, the city, in consideration of a fixed annual expenditure extending through a term of years yet to come, was enabled to get the benefit of immediate repairs, largely in excess of the amount at once payable; and the rate bargained for was likely to be materially less when the party who was to do the work had the cost of the plant, which had to be maitained, spread over ten years, instead of being concentrated upon one or two. These considerations and others, which might be referred to, entirely justify and approve the contract as made.

"They go to show that it was one which, on sound business principles, the city authorities were warranted in making, and that the work which it covered could not have been properly met by any 'hand to mouth' policy from year to year, such as is suggested. All things considered, we are clearly of the opinion that no excess of authority in entering into the contract is shown, and that the plaintiffs, as tax-payers, have no just cause of complaint on account of it."

Mayor Taggart of Indianapolis will soon recommend to the council that $100,000 be expended immediately upon the fire department, in order to carry out some of the suggestions of Insurance Inspector W. H. Johnson, who recently gave the department a thorough overhauling. The $100,000 will be expended for the erection and equipment of two new engine houses, the remodeling of the central house and the installation of a new fire alarm telegraph.

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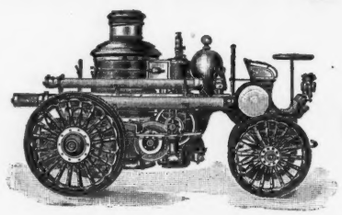

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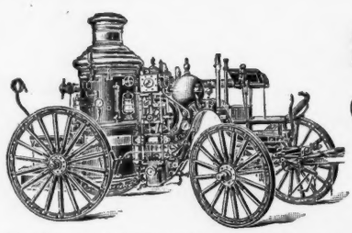

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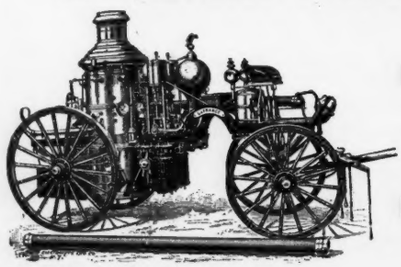

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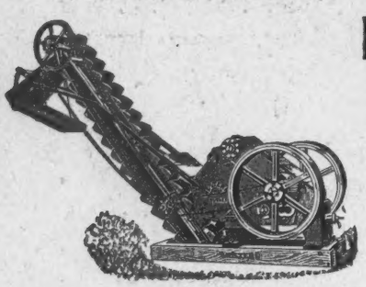

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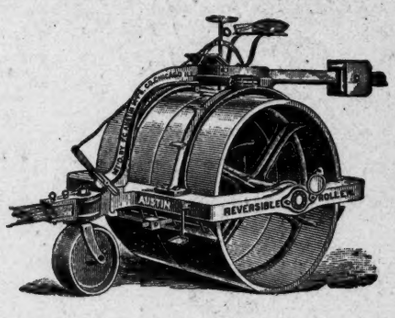

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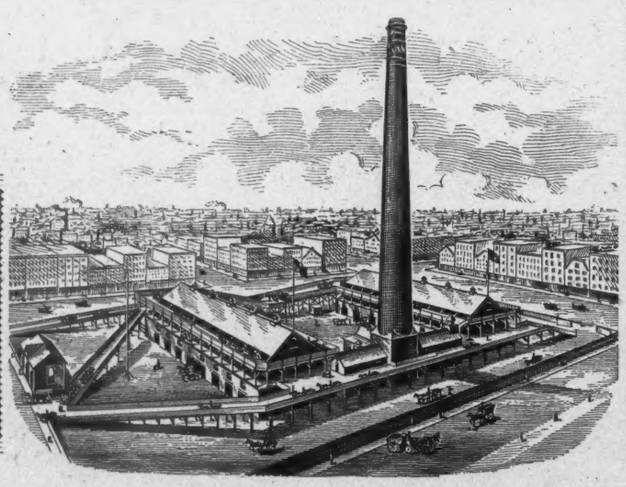

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Resolution Adopted by the California State Board of Health in Reference to the Thackeray Incinerator at San Francisco.

WHEREAS, a careful and exhaustive investigation into the mode of operating the Incinerator lately constructed by the Sanitary Reduction Works Company, at the intersection of Rhode Island and Alameda Streets, in the City and County of San Francisco, having convinced us that the refuse heretofore deposited at designated places in said City and County to the great detriment of the public health and in defiance of all the principles of sanitation, is now being disposed of in a clean and healthful manner and without perceptible odor ; and

WHEREAS, knowing that reduction by fire, the method employed by the Sanitary Reduction Works, is the only thoroughly scientific way of disposing of the refuse and garbage of a city, and it having been demonstrated to us that the Incinerator constructed by the said Company, at the intersection of Rhode Island and Alameda Streets, in the City and County of San Francisco, is the most effective device yet invented for the reduction of refuse and garbage by fire, and that the said Incinerator is capable of burning all the refuse and garbage which will be produced in the said City and County for some years to come, it is

Resolved, by the State Board of Health, that the Incinerator constructed by the Sanitary Reduction Works as aforesaid, be, and is hereby approved and indorsed as the greatest sanitary importance to the City and County of San Francisco, and its population.

Resolved, that in our opinion the Incinerator aforesaid disposes of refuse and garbage in a thoroughly scientific manner and so as to create no odor, or so as not to be in any way detrimental to the public health.

NEW YORK: 33 Nassau Street PHILADELPHIA: Broad and Arch Streets CHICAGO: 54 Lake Street

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For Lighting Streets, Boulevards and Parks.

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With Socket and Attachment

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IS A MECHANICAL AUSTRALIAN BALLOT.

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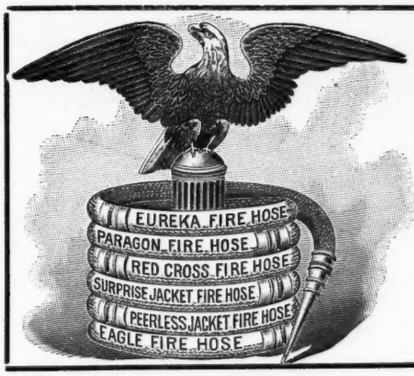

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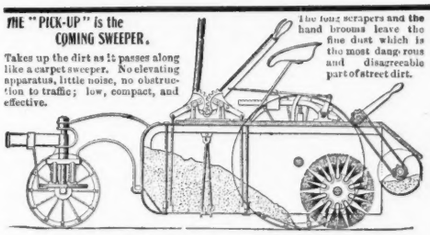
The four scrapers and the hand brooms leave the fine dust which is the most dangerous and disagreeable part of street dirt.



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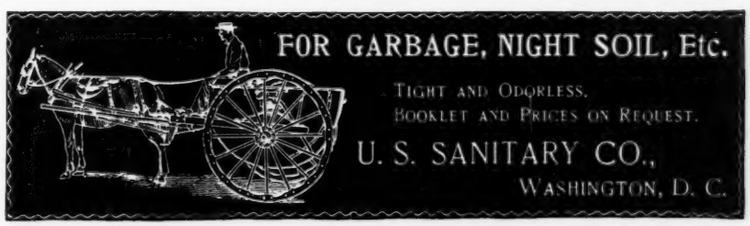

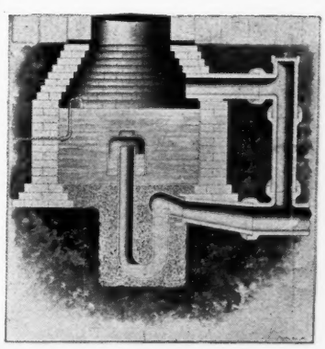

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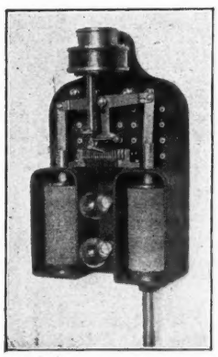

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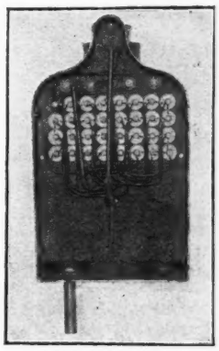

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7½	"	. .	110	100	"	. .	190
10	"	. .	120	200	"	. .	220
15	"	. .	130	300	"	. .	260
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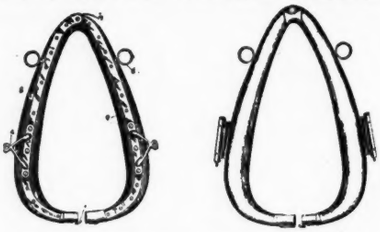

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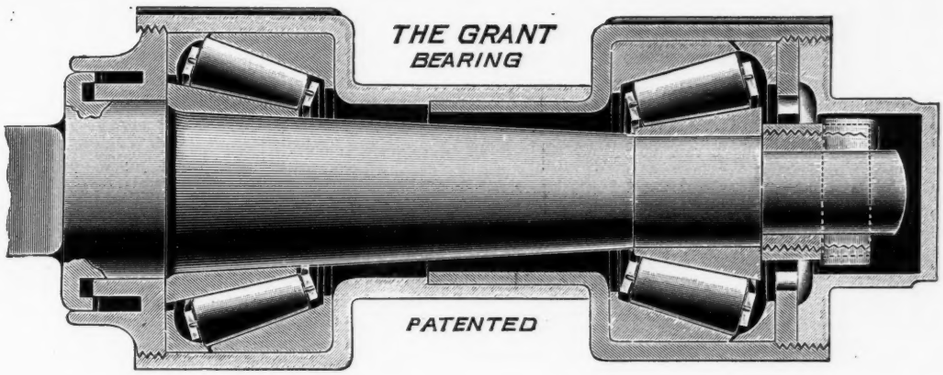

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Used in Rochester and Utica in November, 1898.

225 Standard Machines used in Buffalo, Rochester, Utica, Ithaca, Albion, Canisteo and Winfield, N. Y., in November, 1899,

Giving perfect satisfaction in every election district.

Send for Pamphlet.

ARTHUR S. HAMILTON, General Sales Agent.

THE STANDARD VOTING MACHINE CO.

ROCHESTER, N. Y.

After yesterday's experience, we believe the purchase of the Standard Voting Machines was one of the best investments the city ever made.

With the voting machine there is absolute certainty of a fair vote and honest count.

To say that the voting machines acquitted themselves creditably is but faint and inadequate praise.—*Buffalo Commercial.*

Complete returns from the 108 election districts of the city were received at the City Hall in one hour and twenty-seven minutes. The result was phenomenal. The entire credit belongs to the voting machines and the members of the Press Cycle Club.

There was no hitch in the arrangements anywhere.—*Buffalo Enquirer.*

High praises of the machines come from all quarters. They have met every promise of convenience to voters, speed in voting, automatic and instantaneous footings of the total number of votes cast for each candidate.

All in all, the voting machine is one of the inventive triumphs of the age, and it is as sure in the near future to displace the printed ballot as steam has proven to be in putting out of date the stage coach and the packet boat.—*Rochester Democrat and Chronicle.*

It is a pleasure to witness the complete success of the Standard Machines at the recent election. It is also gratifying to know that a most perplexing problem, that has forever baffled the skill and ingenuity of statecraft and lovers of a pure elective system alike, has been solved in a manner most simple and satisfactory. I am certain our people could not be induced to part with them.—CONRAD DIEHL, *Mayor of Buffalo.*

The second trial of the voting machines has more than justified my endorsement of a year ago.—GEO. E. WARNER, *Mayor of Rochester.*

The Decarie Garbage Incinerator

Disposes in a SANITARY method, of the whole waste of a city, including all vegetable and animal matter, ashes, house sweepings and refuse of all kinds.

The garbage itself furnishes the fuel, and creates steam power to the extent of from two to three horse power per ton of garbage which can be utilized for operating electric light plant or any other municipal industry.

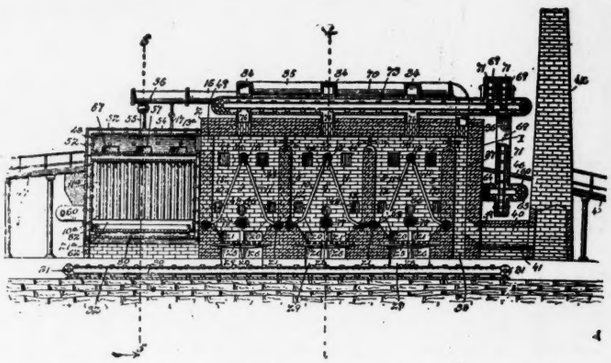

FIG. 2—LONGITUDINAL SECTIONAL VIEW OF ENTIRE CREMATORY.

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The only Machine in existence for cleaning out Catch Basins, Privy Vaults, choked House Drains, etc., in a Sanitary, economical and cleanly manner, at less than half the cost of the present Hand system.

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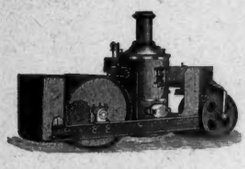
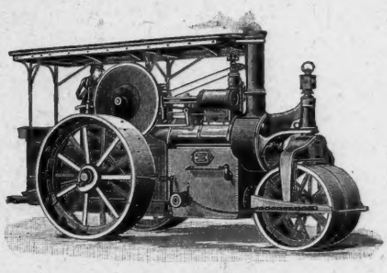


SPRINGFIELD,
OHIO.

Steam Road Rollers
Steam Asphalt Rollers



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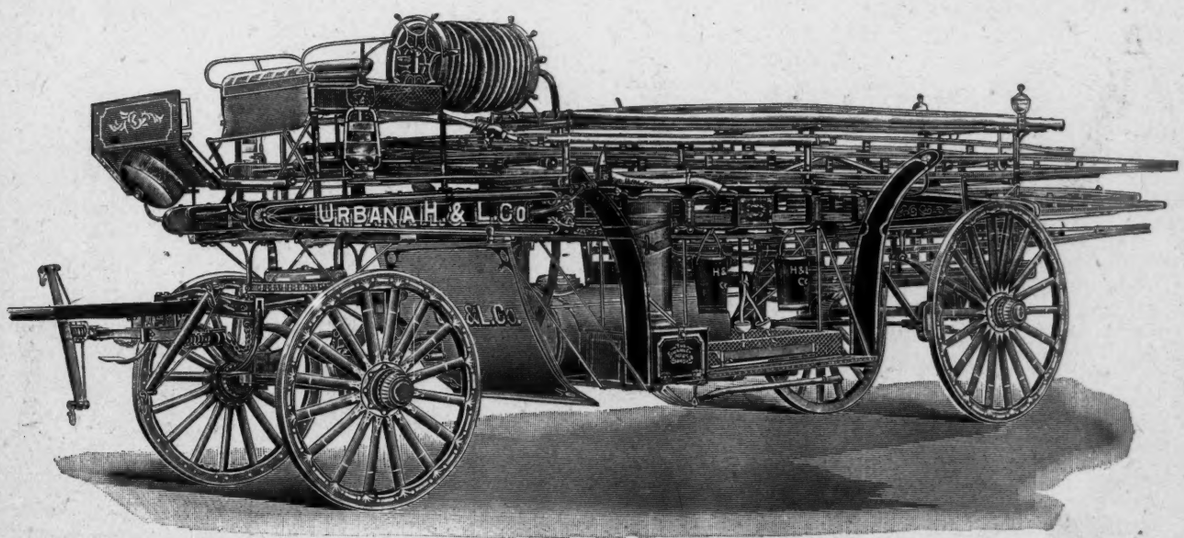

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347648, Aug. 17th, 1886.	625066, May 16th, 1899.	287967, April 18th, 1899.	63167, May 29th, 1899.
357417, Feb. 8th, 1887.	632541, Sept. 5th, 1899.	287968, April 18th, 1899.	61433, Oct. 18th, 1898.
581776, May 4th 1897.	607665, July 19th, 1898.	64139, Sept. 30th, 1899.	62664, Feb. 16th, 1899.
607664, July 19th, 1898.	814499, April 18th, 1899.	64080, Sept. 29th, 1899.	60396, June 21st, 1898.
613848, Nov. 8th, 1898.	814599, April 18th, 1899.	62665, Feb. 16th, 1899.	25621, Dec. 27th, 1886.

67231, May 7th, 1900. Six more patents now pending.

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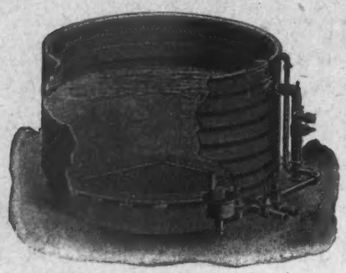

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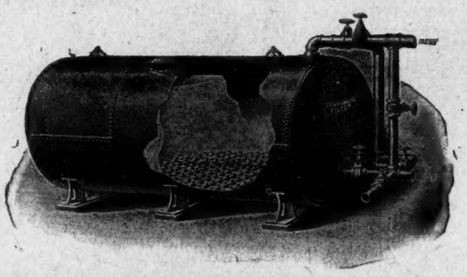

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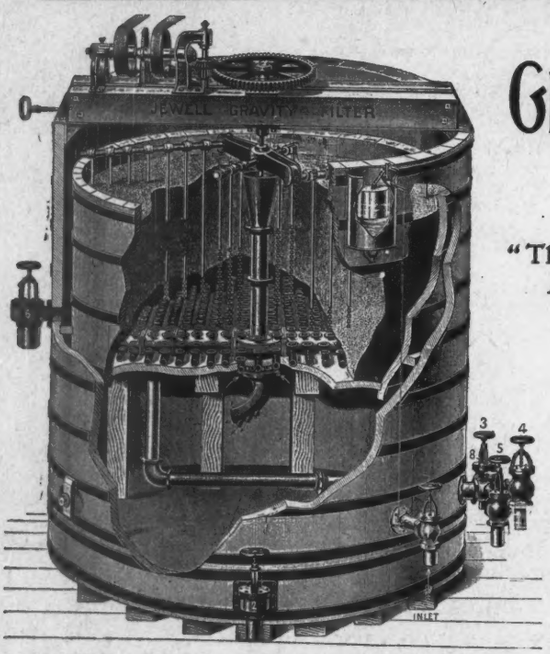

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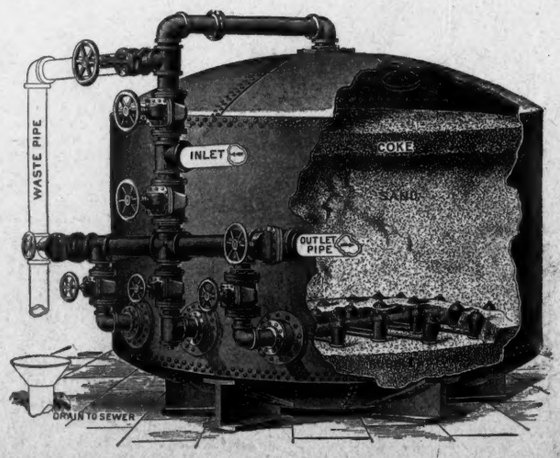

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